

Department of Economic and Social Affairs

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WORLD POPULATION PROSPECTS
AS ASSESSED IN 1963



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NOTE

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PREFACE

Future population estimates are presented in this report for the world, major areas and regions in the period 1960 to 2000, and for each country in the period 1960 to 1980. These supersede the United Nations estimates of future population of the world, regions, and countries published in 1958¹ and the more detailed estimates by sex and age groups for certain regions and countries worked out by the United Nations Secretariat and published at various dates from 1954 to 1959.² The estimates presented here take into account more recent data, including the results of censuses taken in many countries in 1960 and 1961.

A provisional edition of the present report³ has been circulated with an invitation for critical comment by agencies, institutions and experts in various countries. The comments received have been taken into account in this revision and the provisional edition is now superseded.

In addition to the future estimates, retrospective population estimates for the period 1920 to 1960 are presented here, and these likewise supersede estimates in previous United Nations publications, including those shown in the *Demographic Yearbook* for 1963 and earlier issues.

In interpreting the estimates contained in this report and applying them to practical uses, it should be considered that all estimates of future population are subject to considerable errors, as the future trends of birth and death rates and the migratory movements to and from each country cannot be predicted with certainty. The aim of these estimates is to represent an assessment of plausible prospects for the population of each area in the light of information now available. Like all future estimates, these will require revision as new information becomes available.

In addition to the results of the new censuses and other recent data, population projections for various countries calculated recently by agencies and institutions in the countries concerned have been taken into account so far as it was found feasible to incorporate them into a consistent scheme of estimates for the whole world. In this respect, the basis of the estimates in this report differs from that of the future population estimates for the world and its major parts presented in earlier United Nations publications.

¹ *The Future Growth of World Population* (United Nations publication, Sales No.: 58.XIII.2). Earlier United Nations publications of world population projections were: "The Past and Future Growth of World Population—A Long-Range View", *Population Bulletin of the United Nations*, No. 1 (Sales No.: 52.XIII.2), and "Framework for Future Population Estimates, 1950-1980, by World Regions", *Proceedings of the World Population Conference*, vol. III (Sales No.: 55.XIII.8).

² *The Population of Central America (including Mexico), 1950-1980* (Sales No.: 54.XIII.3); *The Population of South America, 1950-1980* (Sales No.: 55.XIII.4); *The Population of South-East Asia (including Ceylon and China (Taiwan)), 1950-1980* (Sales No.: 59.XIII.2); and *The Population of Asia and the Far East, 1950-1980* (Sales No.: 59.XIII.3).

³ *Provisional Report on World Population Prospects as Assessed in 1963* (ST/SOA/SER.R/7).

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Part I
INTRODUCTION

Part II
SUMMARY OF RESULTS

Chapter 3

DEFINITION OF MAJOR AREAS AND REGIONS

The conventional division of land areas of the earth by continents has lost much of its significance for a number of modern purposes and is likely to lose more as time passes. Therefore, although some continental totals are given in this report, the basic scheme of geographical classification used here refers to eight major areas so drawn as to obtain somewhat greater homogeneity in sizes of population, types of demographic circumstances, and accuracy of demographic statistics. Six of the major areas are further subdivided into regions. In this manner, a total of twenty-four regions is arrived at, some of them defined differently than in previous United Nations publications containing demographic statistics.

The twenty-four regions have been grouped to form the dichotomy of more and less developed areas of the world (see map 1). The projections of population totals for more developed and less developed regions are discussed in chapter 6. The list of countries in each region will be found in table A 3.8 of annex 3.

The order of listing of the major areas is that of the size of their population in 1920. Where a major area is composed of several regions, the regions are considered in the order of population size in 1960, except in Africa where it appeared convenient to group the three intertropical regions separately from Northern and Southern Africa. Within each region, countries are considered by order of size of their population in 1960.

For purposes of comparison with earlier publications and with statistics assembled on a continental basis, the necessary modifications have been made so as to derive population estimates for the continents, which are shown in part II, chapter 6, section D.

variants of these projections for certain regions to be beyond the limits of reasonable expectations for increasing productive capacity of the economy within the periods indicated. Such a degree of pessimism is not shared by all experts, however, and it is not appropriate for the purposes of the present projections to entertain such a

view. One of the principal purposes to be served by projections of the kind presented here is to provide a basis for assessing the magnitude of the efforts required to attain given future goals in economic and social development. This purpose cannot be met by constructing projections which would pre-suppose the failure of those efforts.

Chapter 2

DEFINITION AND INTERPRETATION OF VARIANTS OF THE FUTURE POPULATION ESTIMATES

Three sets of future estimates are presented in this report for the world, major areas, and regions: namely, the "medium", "high", and "low" variants. The variants are described in terms of specific assumptions adopted for each area and region, in parts III and IV of this report. In general, only one set of estimates, corresponding to the "medium" variant, is presented for countries.

The "medium" estimates are intended to represent the future population trend that now appears most plausible in view of what is known of past experience and present circumstances in each region. The "high" and "low" variants are intended to represent upper and lower boundaries of a zone of greatest plausibility; they can be interpreted as indications of the extent of error of estimation in the "medium" series that should not be considered a cause for surprise. It must be emphasized, though, that future trends outside the limits of the "high" and "low" variants are by no means impossible.

In addition, an auxiliary variant, "constant fertility, no migration", has been worked out for purposes of comparison (see annex 1). In this variant, fertility is assumed to remain constant at the recent levels, while mortality rates continue to change along the generally decreasing lines observed during recent years, and no migration between regions is assumed to occur in the future. Although this set of assumptions is not regarded as highly plausible for many regions, the projections on this basis furnish a yardstick, comparably defined for all regions, for gauging the effects of the changes in factors of population growth assumed for the other variants.

The width of the span between the "high" and "low" variants differs from one region to another, because demographic trends in some regions have been more stable, have been studied in more detail, and have been measured more accurately than in other regions, and therefore more confidence can be given to the "medium" estimates for some regions than for others. In some regions, where appreciably different prospects appear almost equally plausible, the "medium" estimates aim at the centre of the zone of greatest plausibility. In other regions, where a large underestimate and a large overestimate do not seem equally likely, the arrangement is asymmetrical with "medium" estimates nearer either to the "high" or the "low" variant.

The criteria of plausibility used in selecting assumptions for the different variants refer to the long-range future trends of the birth rates, death rates, and migratory movements without regard to the possibilities of short-term fluctuations. As the example of fluctuating birth rates in industrialized countries during the last three decades

has shown, sizable temporary deviations from the long-range trends of population may occur, and indeed should be expected.

On the other hand, the longer the time-span of future estimates, the greater the likelihood that unforeseen developments may cause the population to move outside the limits which appear plausible at present. Therefore, the calculations are made in such a way that the span of the "high" and "low" variants grows wider in the course of time. In general, the trends of a small population are less stable than those of a larger one and the length of the future period over which estimates can usefully be made is shorter in the case of a small population. For this reason, estimates for individual countries are carried only as far as 1980 while those for regions and major areas extend to the year 2000.

It should be repeated that the span of the "high" and "low" variants does not comprise all possibilities and is only intended to define the zone which now appears to be of greatest plausibility. No allowance is made for such possible disasters as wars and violent social upheavals, which might depopulate a country or the whole world, nor for such potential marvels as medical discoveries making possible a great extension of the human life span, or technological inventions opening up avenues for extraordinary expansion of capacity to produce food and other necessities in the less developed countries. Though such possibilities may exist, it would be improvident to take them as a basis for plans for the future; moreover, their consequences are incalculable.

Continuing substantial progress in economic and social development, however, is implicit in the assumptions on which the estimates are based. Without this, even the increases projected on the "low" variants for some of the most crowded and economically less developed regions might be impossible, either because the basis for support of such numbers would be lacking or because the means of achieving the projected decreases of mortality could not be afforded. Also, according to a widely held view, the declines of birth rates assumed in some of the variants of projections for such areas are only plausible on the assumption of substantial improvements in the conditions of life, which would require economic development outpacing the projected population increases by an ample margin. In some of the economically more developed regions, the projected increases will be sustained even without continuing economic advances, but would appear less plausible as fertility would probably be reduced in such adverse circumstances.

Some experts taking a pessimistic view of the possibilities of economic development may consider some of the

of the population can be noted, due to the emigration of young adults, so that the birth rate is comparatively low and the death rate comparatively high in relation to the prevailing age-specific rates of fertility and mortality. In recent years, emigration has similarly affected the population of Eastern Germany and of Berlin.

While migration can fluctuate widely and occasionally rises to a high wave, rates of migration in the long run come to a lower average. The large waves of migration from Europe to the Americas and Oceania and from China and India to South-East Asia have for the most part ebbed away and though migration continues in some areas at significant rates, it is of generally decreasing importance. Among the reasons is that a majority of the migrants in the large former streams were relatively poor and unskilled. Social development efforts in the traditional areas of emigration have succeeded to a large extent, and in the future should succeed even more, in providing education and economic opportunities for all classes of the society, so that the impulse to emigrate is weakened.

At the same time, the traditional receiving areas have become increasingly preoccupied with problems of social integration of migrants of insufficient education and skills and have instituted policies discouraging large-scale immigration of such persons. As a result, migration in the future will probably tend to be on a reduced scale and, as the population in both the countries of origin and destination increases further, the relative demographic importance of the movements will be even slighter. Some continuation of past streams of migration is to be expected, partly because former migrants keep cultural and family ties with their previous homelands, and partly because economic incentives for migration of workers of selected levels and types of skill will remain. But instances of migration over long periods being comparable to natural increase will be exceptional. Trends in fertility and mortality will dominate the rates of demographic change where large regions are concerned. On a world-wide basis, of course, net immigration in some areas is balanced by net emigration from others.

countries with an annual increase above 1.5 per cent are those with only moderately low fertility.¹

In nearly all the "developing" countries, there remains considerable scope for rapid decreases in the death rate, so that the prevailing tendency is one of accelerating population growth. The "developed" countries, for the most part, are undergoing a progressive increase in the proportion of aged persons in the population; hence, the tendency for them is a gradual slowing-down of population growth, except for appreciable changes that may result from fluctuations in the birth rate.

Plausible prospects of future population growth differ substantially for populations of the two types. Barring events that cannot now be foreseen, the scope of plausible future variations, both in fertility and in mortality, is much wider in the "developing" than in the "developed" regions. In the former, failure of mortality to decline where it is still high would certainly be regarded as a calamity and is not contemplated in this report. An even greater calamity would eventually ensue, at least in the remote future, if fertility decline were to be postponed indefinitely while mortality decline continued. Generally, declines of both fertility and mortality may therefore be expected in the "developing" countries, though the assumption has to be varied from area to area as regards plausible timing and speed of declines. In fact, in some less developed areas, there is a possibility of some increase of fertility before a substantial decline begins. In the "developed" regions, currently prevailing trends may continue well into the future though reasonable allowance has to be made for possible variations of fertility in response to changes in economic and social circumstances.

World population growth has conspicuously accelerated owing to the effects of mortality decline and may still accelerate further for the same reason. Nothing can grow for ever and it is inevitable that this growth must eventually slow down. While the rate of growth can fall to a low level through fertility decline, this would not happen within a few decades, even if fertility decline were to set in at once. There are now large areas of rapid population growth where it is doubtful that any fertility decline will begin within the period of the present projections; if fertility does not decline, the prospect of eventual slowing down of population growth is removed to a more distant future, and the eventual size of the population will be still much larger.

B. INTERNATIONAL MIGRATION AND ITS INFLUENCE ON POPULATION GROWTH

In newly settled lands, such as the United States, Argentina, Canada, Siberia, Australia and New Zealand in the past century, migration was initially the principal source of population growth, even though rates of natural increase were high. As the population of those regions increased in the course of time, the proportionate contributions to population growth made by successive waves of migrants became less, even though the volume of migratory movements increased and rates of natural increase in the countries of immigration diminished. Nevertheless,

¹ In this summary, migration is not taken into account. The countries where migration affects the rate of population growth to any substantial extent, however, are rather few.

even in recent years some countries have occasionally experienced immigration comparable to the current rates of natural population increase. One outstanding example has been Israel, which doubled in population from 1948 to 1951, though the annual rate of natural increase was of the order of only 25 per 1,000. Other examples include Argentina, Canada, Australia and Venezuela, where the balances of immigration during certain brief periods were nearly as large as the excesses of births over deaths, though migration at such a rate did not continue over many years. In larger countries where immigration has been of long standing, a decreasing importance of the migratory balance can be noted. In the United States, for instance, net immigration averaged about 300,000 per year both in the 1920's and in the 1950's. In the earlier period, relative to a 1925 population of 116 million, this was an annual rate of about 2.6 per 1,000; in the later period, with a 1955 population of 166 million, the average annual rate was about 1.8 per 1,000. These rates of net immigration can be compared with rates of natural increase averaging about 10 per 1,000 in the 1920's and about 15 per 1,000 in the 1950's. The contribution of migration to population growth in the United States, then, was about 20 per cent in the 1920's (the remaining 80 per cent being due to natural increase), and little more than 10 per cent in the 1950's.

In some of the most recent years, immigration has considerably boosted the rates of population growth in the Federal Republic of Germany, in France, and in Switzerland, three countries where rates of natural increase are comparatively low. It is uncertain, however, whether immigration on that scale will continue long in these countries, since a majority of the immigrants are Southern Europeans many of whom, sooner or later, may return to their countries of origin. Yet the relative importance of migration in countries with low rates of natural increase cannot be discounted. Thus, for a few years of the 1930's, the death rate in France slightly exceeded the birth rate but, due to continuing immigration from Southern and Eastern Europe, the population of France did not decrease. Immigration tends to contribute all the more to population growth by virtue of the fact that a majority of the migrants are usually young adults. At such ages, they are subject to comparatively low death risks and are apt to marry and bear children. In other words, immigration to a certain extent modifies the age composition of the population in such a manner that, with given levels of fertility and mortality, the birth rate tends to be slightly higher, and the death rate slightly lower, than it would be in the absence of migration.

The obverse is true as regards emigration. During the period of the great trans-Atlantic migration, especially about the turn of the last century, rates of population growth in a number of European countries were appreciably reduced by the net loss of migrants. In particular countries at particular times, the rate of natural increase thereby diminished by a considerable percentage, though not so much that the population ceased growing. Ireland presents an exceptional case; in that country net emigration over the long period has been of such magnitude that the size of the population declined considerably. Also in Ireland a considerable distortion in the age composition

Chapter 1

MAJOR FEATURES OF THE CURRENT WORLD DEMOGRAPHIC SITUATION PERTINENT TO THE FUTURE OUTLOOK

A. CONDITIONS OF MORTALITY AND FERTILITY: TWO POPULATION TYPES

The world population picture has been variously described in numerous recent studies in a period of years during which the basic features themselves changed greatly. Three, or several, population types have been suggested by different experts, usually including at least one designated as "transitional" between two types regarded as extreme. At the present juncture, it is most pertinent to distinguish two major types only, namely, those of regions and countries regarded, by various criteria, as "developed" and "developing". No other criterion, be it *per capita* income, urbanization, literacy, industrialization etc., defines this dichotomy so sharply as the level of fertility.¹ With exceedingly few exceptions, it can be said that where the gross reproduction rate² is greater than 2.0, the country is a "developing" one, and where it is less, the country is "developed". There are also differences in mortality between the two types of countries, but in this respect the association is now less strong than it used to be.

Gross reproduction rates very close to 2.0 are rarely found nowadays. Few of the "developing" countries have their gross reproduction rates outside the range from 2.2 to 3.5, and "developed" countries whose rates fall outside the range from 1.0 to 1.8 are not numerous. The unweighted average of the gross reproduction rate of "developing" countries is 2.9, and a majority of such countries are clustered about that average. For "developed" countries, the rate averages 1.4, but there are two clusters, one around a rate of 1.7, the other around 1.2. "Developed" countries of now comparatively high fertility (though with gross reproduction rates never in excess of 2.1) have invariably gone through a recent period when it was decidedly less. The "typical" ranges of gross reproduction rates, including about two-thirds of the countries in each instance, are 2.6 to 3.3 in the case of "developing" countries and 1.2 to 1.8 in "developed" countries. Thus, though the two

groups of countries differ enormously there is a considerable range of variation within each group.

There is some logic in this dichotomy of fertility levels typically prevailing in "developing" and "developed" countries. Before the days of modern transport, scientific medicine and sanitation, expectation of life at birth was rarely much more than 30 years; now, where the fullest benefit of scientific advances has been reaped, it has risen above 70 years in some countries. With this rise in expectation of life, only about half the previous fertility rates are needed to secure the same rate of net reproduction.³

Mortality has recently declined tremendously in some "developing" countries but less in others. In "developed" countries, on the other hand, the mortality level is now low and the range of variation is rather small. The great majority of "developing" countries is included in a range of expectation of life at birth from about 30 to 60 years. A similar majority of "developed" countries is represented by a variation in expectation of life from about 67 to 72 years.

From the standpoint of rates of population growth, it is necessary to evaluate the crude birth and death rates resulting from such ranges in levels of fertility and mortality, and from age compositions as determined by past trends.

About two-thirds of the "developing" countries are represented by a range in the crude birth rate from 39 to 50 per 1,000, and about two-thirds of the "developed" countries by birth rates of 17 to 23 per 1,000. As regards death rates, the range of 10 to 30 per 1,000 can be taken as representative of "developing" countries and 8 to 12 per 1,000 of "developed" countries. These indications are approximate; and several countries fall outside the representative ranges.

The population of most "developing" countries is now increasing at annual rates ranging from about 1.0 per cent to 3.5 per cent; and that of most "developed" countries at rates typically between 0.5 and 1.7 per cent. Thus, there is some overlap between the two groups as regards current rates of growth. Generally speaking, "developing" countries with a rate of population increase below 1.5 per cent still have very high mortality while "developed"

¹ There is no commonly agreed yardstick by which degrees of "development" (economic, social, cultural etc.) are to be measured. Some countries rank comparatively high in respect of some measures and comparatively low in respect of others (e.g., income, literacy etc.). Also, with most of these measures no marked discontinuity is encountered, numerous countries usually being found in an intermediate group. It has been shown in a recent United Nations study that the dichotomy is in no other case as sharp as it is in respect of fertility. *Population Bulletin of the United Nations, No. 7*, (Sales No.: 64.XIII.2, pp. 1-3).

² The gross reproduction rate (GRR) is defined as the average number of daughters that would be born per woman surviving to the end of her reproductive period in accordance with the prevailing age-specific fertility rates.

³ For instance, in model stable populations, an annual natural increase near 1 per cent (10 per 1,000) requires a gross reproduction rate of about 2.7 when expectation of life is 30 years, and about 1.3 when expectation of life is 70 years, and this is still reflected in the difference between typical gross reproduction rates of "developing" and "developed" countries.

Chapter 4

GROWTH OF POPULATION IN THE WORLD AND ITS MAJOR AREAS UP TO THE YEAR 2000

A. POPULATION GROWTH, 1920-1960

Estimates of population since 1920 for major areas and regions of the world are tabulated in annex 3, table A 3.1.

During the forty years from 1920 to 1960, it is estimated that the world population increased about 61 per cent. The estimated increase was approximately one-tenth in each decade from 1920 to 1950, and nearly one-fifth in the decade of the 1950's. Between 1950 and 1960, it is estimated that the world population was augmented by 483 million persons—a number larger than the population of Europe in 1960 and approximately equal to the combined population of Africa and Latin America.

All major areas shared in the accelerated growth of population during the 1950's. In general, the rate of growth in each area was higher during this decade than it had been in any of the three preceding decades. The only exception was Europe, where the growth rate in the 1950's did not rise higher than that in the 1920's, though it was distinctly higher than the rates of the 1930's and 1940's.

In several areas, the quickening growth of population began in the 1940's and the trend accelerated even more in the 1950's. This is the pattern shown by the estimates for Northern America, Latin America and Oceania. In Northern America and Oceania, growth had slackened during the 1930's, and the quickening during the 1940's only brought the rate back approximately to the level recorded in the 1920's. In Europe and the Soviet Union, where population growth had also slackened during the 1930's, it did not pick up during the war decade of the 1940's; indeed, the Soviet Union then suffered a decrease of population due to the casualties of war. After the war, however, Europe and the Soviet Union joined the worldwide trend of accelerating growth. The estimates for South Asia show a moderate acceleration of growth in the 1930's and a setback in the 1940's, followed by a much higher rate of increase in the 1950's. Little significance can be attached to the trends shown for East Asia and Africa since those rates have been largely assumed.

Latin America has had the highest rate of population growth in every decade since 1920 and Europe has generally had the lowest rate, except in the 1940's when, as already mentioned, population decreased in the Soviet Union. The conjectured rate of growth in East Asia during the 1920's is below that for Europe at that time, but the estimates for East Asia do not merit strict comparison

because of the lack of reliable data on the population trend in mainland China.

The areas of fastest growth over the forty-year period from 1920 to 1960 included Latin America, with an estimated increase of 137 per cent, South Asia with 84 per cent, and Oceania with about 85 per cent. An increase of 91 per cent is indicated for Africa, but the figures are highly uncertain. The increases were more moderate in Northern America (72 per cent), the Soviet Union (38 per cent), and Europe (31 per cent). The increase in East Asia (44 per cent according to the estimates shown) is quite uncertain.

B. LONG-RANGE PROJECTIONS

"High", "low" and "medium" projections for major areas and regions are shown in annex 3, tables A 3.2 to A 3.4,¹ and corresponding decennial rates of increase appearing in tables A 3.6 and A 3.7.

The world population, approximately 3,000 million in 1960, would rise to the order of 5,400 to 7,000 million by 2000, according to these projections. A figure near 6,000 million, or double the 1960 number, seems to be the most likely expectation in view of present knowledge.

The "high" variant implies a marked acceleration of world population growth during the 1960's and 1970's (24 per cent in the latter decade), followed by some slow-down though the growth rate in the 1990's (23 per cent) would still exceed that of the 1950's (19 per cent for that decade). According to the "low" variant, a reduction in the rate of increase in the world total would already appear in the 1960's and it would continue though the rate in the 1990's (14 per cent) would still surpass that of any decade prior to 1950 (e.g., 11 per cent in the 1920's and 1930's). In the growing world total, in spite of a gradual reduction in the proportionate rate of growth, the amounts of increase in the successive decades would keep on growing larger. The additions calculated on the "low" variant are 550 million in the 1960's, 600 million in the 1970's, 640 million in the 1980's, and 670 million in the 1990's; that is, amounts larger than the population of Europe (without the Soviet Union) estimated for the same periods. The "medium" variant, finally, suggests rates of increase to

¹ In these projections, an annual net immigration of 180,000 persons is assumed for Northern America, and 50,000 for Oceania, compensated by annual net emigration of 230,000 from Europe, the migration balances to diminish after 1980 (see part III, chapter 9, section C).

the end of the century which differ little from the rate in the 1950's.

No very literal interpretation is to be given to these results. It is unlikely that the world population will follow as smooth a trend as is calculated on any of the variant assumptions. The calculated trend in the world total is the net result of projections from each region based on various assumptions and including instances where population growth accelerates, others where it diminishes, and yet others where it rises to a peak and subsequently falls off. While the prospects in the regions may have been misjudged in various ways and the trends in each region are subject to unforeseeable fluctuations, it is probable that the trend in the world total will have somewhat greater stability. Events are not precluded, which would cause population trends to move above the "high" or below the "low" variants of the projections throughout much or all of the world.²

C. COMPARISON OF "HIGH", "LOW" AND "MEDIUM" VARIANTS

Differences in the extent of the range between the "high" and "low" estimates for different areas are a partial reflection of differences in the degree of uncertainty regarding future trends of mortality and fertility, although these estimates do not encompass the whole range of future possibilities. The excess of the "high" over the "low" estimates is given in absolute numbers in table 4.1, while table 4.2 shows the per cent variation of the "high" and "low" estimates from the "medium" estimates. No common criterion could be followed in setting the "high" and "low" limits for different areas and the choices made reflect subjective judgements, although an effort has been made to be as objective as possible. While there would also be an uncertainty with regard to the future effects of migration, this additional factor is not reflected in the three variants since in all of them the migration assumptions are identical.

In the case of East Asia, the excess of the "high" over the "medium" and "low" variants is due partly to different assumptions with respect to current levels of fertility and mortality in mainland China, and partly to differences in the assumed future fertility and mortality trends. Varied assumptions as to the initial conditions appeared necessary in this case because of the lack of firmly based data on population changes in recent years. There is also considerable uncertainty with regard to the size of population of mainland China about 1960; nevertheless, all the variant projections start from the same initial estimate. Similar remarks apply to some of the other regions, especially Africa and to a lesser extent, South Asia. Therefore, in

² If much stability could be attributed at least to the long-run momentum of world population growth — though the experience of recent decades does not fully bear that out — one might venture to extrapolate a diminishing rate of growth in the world total beyond the turn of the century. How much further it might diminish within any given period of time is sheer conjecture. Should the increase cease by next mid-century, extrapolation of the present "high" variant would arrive at 11,000 million, the "low" variant at 7,000 million, and the "medium" at 9,000 million by the year 2050. If, by that date, the population were still growing at the decennial rate of 10 per cent — approximately the estimated average for decades between 1920 and 1950 — such an extrapolation to 2050 would carry the high variant to 14,000 million, the "low" to 9,000 million, and the "medium" to 11,000 million. But the significance of such calculations is dubious and plausible limits for the population in the year 2050 might be set wider apart, since within such a long future period many unforeseeable events can occur.

comparing the figures in tables 4.1 and 4.2 for different regions, it must be borne in mind that they do not take account of the element of uncertainty due to lack of reliable data on the present numbers of inhabitants and current levels of the vital rates.

The margin of uncertainty with respect to trends involves especially large numbers in East Asia and South Asia largely because the present levels of fertility and mortality in mainland China are poorly defined, and because it is uncertain how soon appreciable decreases in the birth rates of India and Pakistan may be expected. The divergence is also wide in Africa and Latin America, in Africa owing to the lack of relevant data for assessing future changes in vital rates and in Latin America owing to the difficulty in establishing the probability of early decreases in birth rates. Relatively wide divergences in the Soviet Union, Northern America and Oceania reflect possible large future fluctuations in the birth rates.

The selection of the "medium" variant has not always been guided by symmetry, as present indications often suggest a trend nearer the "high" or the "low" variant as more likely than one along the middle of the road. In Northern America, Latin America and Oceania, the "medium" veers towards the "high" side, and in East Asia and the Soviet Union towards the "low". It is not certain that this judgement is well founded, and revisions will be necessary as new facts become known. Nor is it certain that the limits of the "high" and "low" assumptions have been set widely or narrowly enough in each instance. In this matter also, subjective judgements could not be avoided.

The margins between the "high" and "low" estimates do not exhaust the range of future estimates which may be regarded as having a fair degree of probability. Apart from extraordinary events which may cause discontinuity of trends, fluctuations about the trend are always likely. A temporary fluctuation might carry the population total above or below the margins for a period of some years, since the assumptions have been drawn up on a long-range view.

On the other hand, population trends very near the "high" or the "low" extreme would be unlikely to occur simultaneously in every region; hence, the margins in the world total need not be set as wide as the sum of the margins in the component figures.

TABLE 4.1
Excess of future population estimates according to "high" variant over those based on "low" variant (millions)

| Area | 1970 | 1980 | 1990 | 2000 |
|----------------------------|------|------|------|------|
| WORLD TOTAL | 114 | 403 | 907 | 1545 |
| East Asia | 73 | 205 | 366 | 505 |
| South Asia | 6 | 69 | 235 | 459 |
| Europe | 8 | 25 | 45 | 72 |
| USSR | 10 | 27 | 49 | 86 |
| Africa | 5 | 28 | 83 | 180 |
| Northern America | 11 | 27 | 49 | 82 |
| Latin America | 2 | 21 | 76 | 154 |
| Oceania | 0 | 2 | 4 | 7 |

TABLE 4.2
Percentages by which "high" and "low" estimates are in excess of or less than "medium" estimates

| Area | Per cent excess of "high" | | | | Per cent deficit of "low" | | | |
|------------------|---------------------------|------|------|------|---------------------------|------|------|------|
| | 1970 | 1980 | 1990 | 2000 | 1970 | 1980 | 1990 | 2000 |
| WORLD TOTAL | 1.9 | 5 | 10 | 14 | 1.3 | 4 | 8 | 13 |
| East Asia | 5.0 | 12 | 20 | 26 | 3.1 | 8 | 12 | 15 |
| South Asia | 0.1 | 2 | 7 | 13 | 0.5 | 3 | 6 | 9 |
| Europe | 0.9 | 3 | 4 | 6 | 0.9 | 3 | 4 | 7 |
| USSR | 3.2 | 6 | 9 | 12 | 0.9 | 3 | 6 | 10 |
| Africa | 0.7 | 3 | 7 | 13 | 0.7 | 3 | 7 | 11 |
| Northern America | 2.6 | 5 | 5 | 6 | 2.0 | 5 | 10 | 17 |
| Latin America | 0.1 | 1 | 5 | 8 | 0.5 | 4 | 12 | 20 |
| Oceania | 1.4 | 4 | 6 | 9 | 0.6 | 3 | 8 | 13 |

D. COMPARISON WITH PREVIOUS UNITED NATIONS PROJECTIONS OF WORLD POPULATION

(a) World totals

World population projections have been prepared by the United Nations on three previous occasions, in 1951, 1954 and 1957.³ Those of 1951 and 1954 terminated with the year 1980, and those of 1957, like the present, were extended to the end of the century. In the three previous studies, 1950 was the starting point, and the world total

at that date was estimated as 2,406 million in 1951, 2,454 million in 1954, and 2,500 million in 1957, whereas the present estimate for 1950 totals 2,517 million. The adjustments in the 1950 total made in 1954 and 1957 reflect mainly increased estimates of the population of mainland China, and now it is believed that the population of Africa also was probably somewhat larger.

Since growth during 1950-1960 was underestimated on the previous occasions, only the "high" estimates for 1960 are worth comparing; these were 2,731 million in the projections of 1951, 2,823 million in those of 1954, 2,920 million in those of 1957, and 2,998 million in the present report, an increase of nearly 100 million on each occasion. The successive rises in the 1960 estimate only partly reflect upward adjustments in the 1950 estimate. An increase for the 1950-1960 decade of 13.5 per cent was estimated in 1951, 15 per cent in 1954, 17 per cent in 1957

³ "The Past and Future Growth of World Population—A Long-Range View", *Population Bulletin No. 1*, (United Nations publication, Sales No.: 52.XIII.2; "Framework for Future Population Estimates, 1950-1980, by World Region", *Proceedings of the World Population Conference, 1954*, vol. III (United Nations publication, Sales No.: 55.XIII.8, pp. 283-328; and *The Future Growth of World Population* (United Nations publication, Sales No.: 58.XIII.2.

TABLE 4.3
World population totals calculated with variant assumptions in 1957 and in the present report

| Variant | 1960 | 1970 | 1980 | 1990 | 2000 |
|-------------------------------|-------|-------|-------|-------|-------|
| POPULATION (MILLIONS) | | | | | |
| <i>1957 projections:</i> | | | | | |
| "High" | 2,920 | 3,500 | 4,280 | 5,360 | 6,900 |
| "Medium" | 2,910 | 3,480 | 4,220 | 5,140 | 6,280 |
| "Low" | 2,900 | 3,350 | 3,850 | 4,370 | 4,880 |
| <i>Present report:</i> | | | | | |
| "High" | 2,998 | 3,659 | 4,551 | 5,690 | 6,994 |
| "Medium" | 2,998 | 3,592 | 4,330 | 5,188 | 6,130 |
| "Low" | 2,998 | 3,545 | 4,147 | 4,783 | 5,449 |
| DECENNIAL INCREASE (PER CENT) | | | | | |
| <i>1957 projections:</i> | | | | | |
| "High" | | 20 | 22 | 25 | 29 |
| "Medium" | | 20 | 21 | 22 | 22 |
| "Low" | | 16 | 15 | 14 | 12 |
| <i>Present report:</i> | | | | | |
| "High" | | 22 | 24 | 25 | 23 |
| "Medium" | | 20 | 21 | 20 | 18 |
| "Low" | | 18 | 17 | 15 | 14 |

TABLE 4.4
Major area totals, "medium" estimates, 1960-2000, according to assessments of 1957 and present report

| Area and source of estimate | 1960 | 1970 | 1980 | 1990 | 2000 |
|---|------|-------|-------|-------|-------|
| POPULATION (MILLIONS) | | | | | |
| <i>East Asia</i> | | | | | |
| 1957 projections | 796 | 966 | 1,204 | 1,489 | 1,853 |
| Present report | 794 | 910 | 1,041 | 1,168 | 1,287 |
| <i>South Asia</i> | | | | | |
| 1957 projections | 827 | 1,013 | 1,273 | 1,600 | 2,014 |
| Present report | 865 | 1,107 | 1,420 | 1,783 | 2,171 |
| <i>Europe</i> | | | | | |
| 1957 projections | 424 | 457 | 495 | 532 | 568 |
| Present report | 425 | 454 | 479 | 504 | 527 |
| <i>USSR</i> | | | | | |
| 1957 projections | 215 | 254 | 297 | 339 | 379 |
| Present report | 214 | 246 | 278 | 316 | 353 |
| <i>Africa</i> | | | | | |
| 1957 projections | 235 | 278 | 333 | 410 | 517 |
| Present report | 273 | 346 | 449 | 587 | 768 |
| <i>Northern America</i> | | | | | |
| 1957 projections ^a | 197 | 225 | 254 | 283 | 312 |
| Present report ^b | 199 | 227 | 262 | 306 | 354 |
| <i>Latin America</i> | | | | | |
| 1957 projections | 206 | 265 | 348 | 456 | 592 |
| Present report | 212 | 283 | 378 | 498 | 638 |
| <i>Oceania</i> | | | | | |
| 1957 projections ^a | 16.3 | 19.4 | 22.5 | 25.7 | 29.3 |
| Present report ^b | 15.7 | 18.7 | 22.6 | 27.0 | 31.9 |
| DECENNIAL INCREASE (PER CENT) | | | | | |
| <i>East Asia</i> | | | | | |
| 1957 projections | | 21 | 25 | 24 | 24 |
| Present report | | 15 | 14 | 12 | 10 |
| <i>South Asia</i> | | | | | |
| 1957 projections | | 22 | 26 | 26 | 26 |
| Present report | | 28 | 28 | 26 | 22 |
| <i>Europe</i> | | | | | |
| 1957 projections | | 8 | 8 | 7 | 7 |
| Present report | | 7 | 6 | 5 | 5 |
| <i>USSR</i> | | | | | |
| 1957 projections | | 18 | 17 | 14 | 12 |
| Present report | | 15 | 13 | 14 | 12 |
| <i>Africa</i> | | | | | |
| 1957 projections | | 18 | 20 | 23 | 26 |
| Present report | | 27 | 30 | 31 | 31 |
| <i>Northern America</i> | | | | | |
| 1957 projections ^a | | 14 | 13 | 11 | 10 |
| Present report ^b | | 14 | 15 | 17 | 16 |
| <i>Latin America</i> | | | | | |
| 1957 projections | | 29 | 31 | 31 | 30 |
| Present report | | 33 | 34 | 32 | 28 |
| <i>Oceania</i> | | | | | |
| 1957 projections ^a | | 19 | 16 | 14 | 14 |
| Present report ^b | | 19 | 21 | 19 | 18 |

^a Excludes Hawaii.

^b Includes Hawaii.

“high” variants in each instance), and now it is estimated to have been 19 per cent.

The “high” projections of 1951, 1954, and 1957 brought the 1980 total to 3,636, 3,990 and 4,280 million, respectively, the last of these being comparable to the present “medium” estimate (4,330 million), but not to the present “high” (4,551 million). For the 1960-1980 period, the “high” variants calculated in 1951, 1954, 1957 implied increases of 33, 41 and 47 per 100, respectively, whereas the increase indicated by the present “high” projection is 52 per cent.

While the assessments of the size and rate of growth in world population had to be raised on each occasion, it does not follow that world population growth will inevitably outpace all expectations. Each time, the calculations were made on the basis of improved data, experience and methods of analysis and though many a surprise may still be in store, it is probable that the assessments have become increasingly realistic. In the present report, the long-range view, beyond the period 1980, is considerably modified so that the world total at the end of the century is now estimated in a range similar to that of the 1957 estimates, though the present projections for 1980 are higher than heretofore, as new data show world population currently growing at a faster rate than was projected in 1957. The new “high” variant, although it is considerably higher than the previous one for 1980, implies enough reduction in rates of growth afterward so that an end-century total of 6,994 million results, which is only slightly above the previous “high” variant.

The new “medium” variant implies, among other details, somewhat earlier fertility decline in large parts of the world than did the “medium” variant calculated in 1957. Accordingly, the present “medium” end-century estimate is a world total of 6,130 million, as compared with the previous “medium” of 6,280 million.

The new “low” variant implies still earlier fertility decline in large areas, though not as early as was thought possible when the “low” variant was calculated in 1957. The new “low” estimate for the year 2000 is 5,449 million, as compared with 4,880 million previously estimated.

A major change is seen in the present estimates for growth during 1980-2000, as compared with those made in 1957. Then, the 1980-2000 increases were variously estimated as 61, 49 or 27 per cent. Now, the three variants give 1980-2000 increases of 54, 42 or 31 per cent. The

range of estimates for this distant period has narrowed and the calculated increases have been lowered, especially for the “medium” variant, though not for the “low” variant.

The world totals for dates from 1960 to 2000 according to varied assumptions in this and the previous report of 1957 can be compared in further detail in table 4.3.

(b) “Medium” projection for major areas

For each major area, table 4.4 compares “medium” projections of the present and the preceding 1957 report up to the end of the century. Aside from re-estimation of the present size of population in each area and of current fertility and mortality levels, the differences also reflect the change in methods of projection. The 1957 regional population projections were derived from a limited number of projected population models with the assumption that the regional population growth rates would in the course of time approximate more and more closely the corresponding models. The result was gradual convergence of rates of growth towards three types, one represented by most of Asia, Africa and Latin America, a second by the Soviet Union, Northern America, Temperate South America, Australia and New Zealand, and the third type by Europe and Japan. By contrast, in the present report, projections have been calculated with assumptions formulated separately for each region, despite admittedly large areas of uncertainty in many regions. The result of present assumptions for large parts of the world is an accelerated population growth which eventually slows down, sooner in some regions and later in others, the peak growth rates to be attained being higher in some regions and lower in others.

Because of this difference in the formulation of specific assumptions, the differences in projected trends cannot be attributed clearly to any particular factor. As a net result of new information and greater boldness, perhaps, in drawing assumptions more flexibly, the end-century estimates (“medium” variant) now exceed those made previously in Africa by 48 per cent, in Northern America and Oceania by 13 and 9 per cent, and by 8 per cent in both Latin America and South Asia. On the other hand, the “medium” estimate for East Asia by the end of the century now falls 31 per cent short of the one made previously, and those for Europe and the Soviet Union have each been reduced by 7 per cent.

Chapter 5
PROJECTED POPULATION CHANGES IN TWENTY-FOUR REGIONS
UP TO 1980

In this chapter, population projections for the period 1960-1980 are compared for the component regions in each major area of the world. Attention is confined here to the "medium" projections; other variants and projections for 1980-2000 will be found in the chapters of part IV. Details of the assumptions adopted and the base data used for each region and the component countries will also be found in part IV.

A. SUMMARY OF REGIONAL PROJECTIONS

The projections for the twenty-four regions up to 1980 are shown in annex 3, table A 3.2, and the corresponding projected decennial rates of increase in table A 3.6.

(a) *East Asia*

In East Asia, the projections imply a 30 per cent increase during 1960-1980 for the mainland region (including Hong Kong, Mongolia and Macao in addition to mainland China), only 19 per cent for Japan, 71 per cent for the remainder of East Asia (Korea, China (Taiwan), and the Ryukyu Islands), and 31 per cent for the three regions combined. The relatively small increase for Japan is the result of an already low level of fertility which is expected to fall temporarily still lower in the near future and then return approximately to the present level. The projection for the mainland region is dominated by the results of the conjectures adopted for the large population of mainland China, where fertility is assumed soon to begin falling from its present moderately high level, offsetting and eventually overbalancing the assumed future decrease of mortality so that the rate of population growth would decline noticeably after 1975. The mainland China projection, however, is based insecurely on inadequate information about the present size and past growth of the population as well as the levels and trends of fertility and mortality. The projected figures for the mainland region are rounded to the nearest million in view of the uncertainty of the base data for mainland China. For the "Other East Asia" region, the recent rates of population growth have been quite high as a result of higher fertility and lower mortality in the countries of this region compared with estimates for mainland China. Some moderation of the growth rate for Other East Asia is indicated by the projection for the twenty-year period as a result of a declining trend of fertility which is already apparent in China (Taiwan), and the Ryukyu Islands and is expected to begin soon in Korea as well.

(b) *South Asia*

South Asia is divided into three regions. Middle South Asia comprises India, Pakistan, Iran, Afghanistan, and smaller countries and islands adjacent to them. South-East Asia is the portion of Asia east of India and south of China, while South-West Asia comprises the countries west of Iran. Because of an assumed fertility decline, though mortality also is decreasing, the rate of population growth in Middle South Asia is calculated to reach a peak in 1970-1975 and gradually to diminish thereafter. Fertility decline is also assumed for some countries in South-East and South-West Asia; both these regions have higher average fertility at present than Middle South Asia. In South-East Asia and to a lesser extent in South-West Asia, the age composition of the population has been affected by wartime fluctuations of the birth rate in the 1940's; hence, fluctuations may occur in the future when the children born in the 1940's reach reproductive age. The calculated increases from 1960 to 1980 are 62 per cent in Middle South Asia, 66 per cent in South-East Asia, 73 per cent in South-West Asia, and 64 per cent for the three regions combined.

(c) *Europe*

The four regions of Europe as defined here¹ resemble one another very closely in their current average levels of fertility and mortality, which are among the lowest in the world. The low levels of fertility were reached more recently in Southern and Eastern Europe than in Western and Northern Europe; hence, the regional populations differ somewhat in age composition. With nearly equal fertility and mortality, birth rates in Southern and Eastern Europe now tend to be somewhat higher and death rates somewhat lower than in Western and Northern Europe but, unless trends diverge again, these differences will diminish in the course of time. Since the rates of natural increase are low, migration can have a noticeable effect on population growth. While regional migration in Europe may develop in unpredictable ways, the following assumptions are retained for world-wide comparisons: annual net immigration of 100,000 in Western Europe, and net emigration of 225,000 in Southern, 7,500 in Eastern, and 97,500 in Northern Europe. Because of relatively high rates of population increase reflected in the official population estimates for several European countries in 1961 and 1962, the regional projections have been pro-rated

¹ For the list of countries in each region, see annex 3, table A 3.8.

to totals estimated for 1962, though somewhat lower rates of increase are projected into the future.

In the twenty-year period, the population of Eastern Europe would increase by 17 per cent, Western and Southern Europe by 13 per cent each, and Northern Europe by 7 per cent. Together, the four regions of Europe would have a population gain of 13 per cent. These differences reflect variations of age composition of the population due to earlier trends and of assumed migration, though fertility and mortality in all four regions are nearly the same and little reason can be seen for expecting them to diverge in the future. During 1965-1980, the rate of population growth would remain nearly constant in Eastern Europe, whereas it would slow down somewhat in Western, Southern and Northern Europe. Unpredictable changes in migration, however, make this quite uncertain.

(d) *The USSR*

The figures for the USSR shown in annex 3, table A 3.2 are the results of a population projection calculated by the Central Statistical Office of the Soviet Union, adjusted so as to coincide with mid-year dates. Mortality is very low and the projection, which takes account of different trends to be expected in urban and rural areas, assumes a temporary continuation in the recent decrease of fertility, which is moderately low, followed by a slight recovery. The population suffered severe losses in the recent war which are reflected in its composition by sex and age groups and have some effect on crude birth rates and death rates. The projection shows population growth slowing down until the early part of the 1970's, and then quickening somewhat. The population is estimated to increase by 30 per cent in the twenty years.

(e) *Africa*

In this report, Africa is divided into five regions, *viz.*, Northern and Southern Africa (lying mostly outside the tropics) and Western, Eastern and Middle regions within the tropics. Mortality in the tropical regions is still high though probably decreasing appreciably, while in Northern and Southern Africa it has already decreased more considerably. According to data now available, the regions show wide differences in fertility, ranging from moderately high in Middle Africa to very high in Western Africa, whereas in Eastern, Northern and Southern Africa, fertility is nearer the middle of the high range.

While mortality reductions are to be expected, there are impediments to the rapid propagation of modern public-health methods, especially in the tropical regions, and these are taken into account in the "medium" assumptions for future trends. The onset of a fertility decline within the period of the projection is one of the assumptions of the "medium" variant in Northern Africa. In the tropical regions and in Southern Africa, fertility is expected to remain high at least up to 1980, but the possibility of a small decrease in Western Africa, where it is very high, and some increase in Middle Africa, where it is moderately high, is taken into account since both the present estimates and the factors likely to affect future trends are uncertain.

The figures in annex 3, table A 3.2 indicate for the period up to 1980 population increases of 76 per cent in Northern Africa, 74 per cent in Western Africa, 68 per cent in Southern Africa, 50 per cent in Eastern Africa, and 43 per cent in Middle Africa. For the three tropical regions combined, the increase would be 60 per cent and for the entire continent, 64 per cent. In each region, there would be a gradual acceleration of growth, although in Western Africa the assumed decrease in the birth rate nearly offsets the assumed decrease in the death rate.

Though figures are shown to the nearest thousand, there is much uncertainty concerning the size and rate of growth of the population in many parts of Africa and large changes in the estimates may be necessary when more data are obtained.

(f) *Northern America*

For the "medium" variant for this region, use was made of a recent population projection calculated by the United States Bureau of the Census from which a corresponding projection for Canada was derived on the assumption that the trend of the Canadian birth rate would parallel that in the United States much as it has done in the past. The projections were modified in respect of migration for the sake of international comparability. Mortality in this region is very low and fertility moderately low. The projection takes into account the effects of changes not merely in age composition but also in the timing of births to successive generations of women, implying a temporary decrease in the crude birth rate with some subsequent recovery, as is reflected in the resulting rates of population growth. As a net result of the assumptions, a 32 per cent increase in the regional population would occur within twenty years.

(g) *Latin America*

Among the four regions of Latin America as defined here, the Middle American mainland has the highest fertility, and fertility is nearly as high in Tropical South America, moderately high in the Caribbean, and moderately low in Temperate South America. (Temperate South America is defined as including Argentina, Chile, Paraguay and Uruguay; the remainder of the continent is included in Tropical South America. Paraguay, however, more closely resembles the countries of the Tropical Region than other countries in the Temperate Region of South America, in level of fertility and other demographic economic and social characteristics.) In all these regions, some decrease of fertility can be expected but in view of the scarcity of indications of its imminence, the "medium" assumptions have been formulated conservatively. Mortality is fairly low in all four regions and lowest in Temperate South America. In view of the levels already attained, where additional achievements become increasingly costly, further decreases in mortality have also been assumed somewhat conservatively. The possibility of some net immigration into Temperate South America, and net emigration from the Middle American mainland and the Caribbean, has been taken into account.

The projections for the 1960-1980 period indicate population increases of 93 per cent in the Middle American

mainland, 86 per cent in Tropical South America, 59 per cent in the Caribbean, and 41 per cent in Temperate South America. For the combined area of Latin America, the increase would be 78 per cent. The diminishing rate of increase in Temperate South America is in part related to previous fertility decline causing a rising proportion of aged persons in the population. A slight acceleration in the course of the 1960's followed by a gradual slowing down is implied in the projections for Tropical South America and the Caribbean, while the high rate of population growth in the Middle American mainland would persist somewhat longer, according to these projections.

(h) *Oceania*

Moderately low fertility and very low mortality prevail in Australia and New Zealand, and the projections for the region composed of these two countries foresee a temporary decrease in the crude birth rate, followed by a renewed rise when enlarged generation born under the increased birth rates of recent years enters reproductive ages. Net immigration on a scale which significantly affects the rate of population growth is assumed to continue.³ For Melanesia (i.e., the Western half of the island of New Guinea and adjacent smaller islands), about which there is little demographic information, it was conjectured that population would grow at rates similar to those of Middle Africa. The population of the widely scattered islands of Polynesia and Micronesia is small but, with high fertility and quite low mortality, may increase at a high rate. The future trend of economic development of that region is unpredictable and emigration may become important; hence, it was conjectured that population would grow up to 1980 at rates as high or higher than those recorded recently. The projected twenty-year increase is 40 per cent in Australia and New Zealand and somewhat more in Melanesia, while the projected population of Polynesia and Micronesia nearly doubles. The combined area of Oceania might have a population increase of 44 per cent.

B. CHANGES IN POPULATION TREND, 1950-1980, ACCORDING TO "MEDIUM" PROJECTIONS

The future changes in rates of population growth implied by the "medium" projections for different regions are, of course, merely reflections of the assumptions made for each region and since the assumptions represent subjective judgements any definite inference would be unwarranted. Population prospects may not have been equally well judged for all regions.

As stated in chapter 1, the world's regions and countries can now be divided into two groups that are clearly distinguished in terms of fertility as well as economic and social development. The comparisons below are made separately for low-fertility and high-fertility regions,⁴ which correspond to the groups of economically more

developed and less developed regions. Only the "medium" variants are compared, but different results would be obtained from a comparison of other variants of the regional projections.

TABLE 5.1

Decennial population increase (per cent) recorded in 1950-1960 and projected for 1960-1970 and 1970-1980 ("medium" variant) in low-fertility regions

| Region | Increase 1950-1960 | Projected increase | |
|---------------------------------|-----------------------|--------------------|-----------|
| | | 1960-1970 | 1970-1980 |
| Australia and New Zealand . . . | 25.3 | 17.9 | 18.6 |
| Temperate South America . . . | 22.1 | 19.8 | 17.6 |
| Northern America | 19.6 | 14.2 | 15.4 |
| USSR | 19.1 | 14.6 | 13.1 |
| Japan | 12.4 | 8.9 | 9.5 |
| Western Europe | 9.9 | 6.9 | 5.6 |
| Eastern Europe | 9.5 | 8.8 | 7.8 |
| Southern Europe | 8.4 | 7.0 | 5.5 |
| Northern Europe | 4.6 | 4.4 | 2.8 |

In a comparison of the decennial population increases in low-fertility regions recorded in the 1950's and projected into the 1960's and 1970's, given in table 5.1, the following observations stand out. First, among the nine regions of low fertility, there are four of "moderately low" and five of "very low" fertility, and population growth in the former group is considerably more rapid than in the latter. The regions of "moderately low" fertility are those where European settlers have established themselves in large and previously sparsely inhabited areas; they include the regions of European overseas settlement as well as the Soviet Union.⁴ The regions of "very low" fertility comprise Europe outside the Soviet Union, and Japan. Secondly, a peak rate of population increase occurred in the 1950's in low fertility regions and this will not be exceeded in the next decades according to the projections. For the 1970's, the "medium" projection foresees further reductions in rates of growth in six of the nine low-fertility regions, but not in Australia and New Zealand, Northern America, and Japan, where the indication seems to be for a slight upturn from the reduced rates of increase in the 1960's. Of course, the conclusion is uncertain since fluctuations of migration or other changes in underlying conditions may cause unforeseeable ups and downs in future population growth.

For the fifteen regions of high fertility, the "medium" projections almost invariably imply attainment of a peak rate of population growth at some time before the end of the present century, followed by lower rates of growth in ensuing periods. The regions differ in the period for which the peak rate is projected and in the peak level of the growth rate.

To facilitate comparison, the high-fertility regions are grouped in table 5.2 according to the peak period of growth as implied in the "medium" projections. If the

³ The projection for New Zealand was derived from that for Australia in the same way that a projection for Canada was derived from one for the United States.

⁴ Fertility is regarded as "low" where the gross reproduction rate is smaller than 2.0 and "high" where it is larger. There are wide variations in level within the ranges of "low" and "high" fertility.

⁴ Another population of this type, with "moderately low" fertility, is the European minority in South Africa.

TABLE 5.2

Decennial population increase (per cent) estimated for 1950-1960 and projected for 1960-1970 and 1970-1980 ("medium" variant) in high fertility regions

| Region | Increase, 1950-1960 | Projected increase | |
|--|---------------------|--------------------|-------------------|
| | | 1960-1970 | 1970-1980 |
| <i>Peak in the 1950's</i> | | | |
| Mainland East Asia | 16.2 ^a | 14.4 | 13.6 |
| <i>Peak in the 1960's</i> | | | |
| Tropical South America | 33.2 | 36.8 | 36.2 |
| South-East Asia | 26.9 | 29.3 | 28.7 |
| <i>Peak in the 1970's</i> | | | |
| Middle American mainland | 34.9 | 38.0 | 40.0 |
| Polynesia and Micronesia | 32.3 | 40.9 ^d | 44.0 ^d |
| South-West Asia | 30.7 ^c | 30.2 | 32.8 |
| Northern Africa | 25.4 | 31.5 | 34.2 |
| Caribbean | 21.9 | 25.5 | 26.4 |
| Middle South Asia | 21.1 | 27.2 | 27.7 |
| Other East Asia ^b | 20.7 ^e | 30.6 | 31.1 |
| <i>Peak in the 1980's</i> | | | |
| Southern Africa | 26.4 | 28.7 | 30.4 |
| <i>Peak after the 1980's</i> | | | |
| Western Africa | 31.0 ^a | 31.3 | 32.7 |
| Eastern Africa | 22.8 ^a | 20.5 | 24.5 |
| Middle Africa | 13.3 ^a | 17.7 | 21.9 |
| Melanesia | 13.3 ^a | 17.7 | 21.9 |

^a Estimate depends largely on conjecture.

^b Korea, China (Taiwan), and Ryukyu Islands.

^c Rate reflects effects of hostilities in Korea.

^d Assumed rates, not a detailed projection.

^e High rate due partly to immigration to Israel.

"high" projections were used, the peaks would occur later and rise to higher levels, while use of the "low" projections would have an opposite effect. Since subjective judgement could not be avoided in selecting the "medium" assumptions, no definite forecast should be based on this comparison. It is of interest chiefly as an illustration of shifts in the world demographic picture on the assumption, probably unwarranted, that the "medium" variant will be near reality in the case of every region.

The inference that a peak rate of growth in the East Asian mainland already occurred in the 1950's may be illusory, though some reasons can be offered to support

this as a plausible view.⁵ If it is correct, this region is exceptional among those of high fertility since, according to the "medium" projections, all other regions having a peak growth in the 1950's are low-fertility regions.

It is probably significant that in the regions attaining a peak rate in the 1960's, the rate of population growth, according to the "medium" projections, would only be very slightly reduced in the 1970's and would then still exceed that of the 1950's. Of course, the future cannot be foreseen with such precision and it may be quite fortuitous that Tropical South America is found in this group, while the Middle American mainland and the Caribbean appear in the next group. The possibility that rises to the peak rate of growth may be steeper than subsequent declines is implicit in the manner in which the assumptions as to future fertility declines have been drawn up. To make the assumptions in this form seems to be well indicated by past observations in areas where fertility has declined from a high to a low level; such declines have almost invariably begun quite slowly. Though future experience may prove different from that of the past, it remains probable that large reductions in rates of population growth as a result of decreases in fertility will not ordinarily occur in less than two decades.

There is the possibility that in regions where peak rates are attained later, the peaks will be higher than those in regions where the maximum rate of growth is attained in the nearer future. The peak increase of 16 per cent estimated for the 1950's in East Asia may easily be in error; but if it were correct, this "early" peak would be a moderate rate compared with peak rates calculated to occur later in other regions.

The peak rates calculated to occur in the 1960's and 1970's range between about 26 and 44 per cent and peak rates in Africa south of the Sahara and Melanesia, projected to occur after 1980, would also fall within that range, according to "medium" assumptions. Such high rates of population growth are unprecedented in history except where previously empty lands were being colonized. Yet higher rates would result if mortality should go on declining and fertility should remain high,⁶ and rates nearly as high as the peak may persist for some time after the peak is passed since sudden reductions in fertility must be considered as unlikely.

⁵ See chapter 10.

⁶ See the results of the "constant fertility, no migration" projections in annex 3.

Chapter 6

POPULATION PROSPECTS IN MORE AND LESS DEVELOPED REGIONS AND CONTINENTS

A. POPULATION GROWTH IN MORE AND LESS DEVELOPED REGIONS UP TO THE YEAR 2000

The population estimates for the twenty-four regions have been grouped to obtain totals for the economically more developed and less developed regions, which correspond, as pointed out in chapter 1, to the regions of low and high fertility (gross reproduction rates below and above 2.0, respectively). The composition of the two groups of regions is as follows:

| | <i>1960 population (millions)</i> |
|--|---------------------------------------|
| <i>More developed regions (with low fertility):</i> | |
| USSR | 214 |
| Northern America | 199 |
| Western Europe | 135 |
| Southern Europe | 117 |
| Eastern Europe | 97 |
| Japan | 93 |
| Northern Europe | 76 |
| Temperate South America | 33 |
| Australia and New Zealand. | 12.7 |
| TOTAL | 977 ^a |
| <i>Less developed regions (with high fertility):</i> | |
| Mainland East Asia | 654 |
| Middle South Asia | 587 |
| South-East Asia | 219 |
| Tropical South America | 112 |
| Western Africa | 86 |
| Eastern Africa | 75 |
| Northern Africa | 66 |
| South-West Asia | 59 |
| Middle American mainland | 47 |
| Other East Asia | 47 |
| Middle Africa | 28 |
| Caribbean | 20 |
| Southern Africa | 18 |
| Melanesia. | 2.2 |
| Polynesia and Micronesia. | 0.9 |
| TOTAL | 2,021 ^a |

^a Sum of rounded regional totals.

Table 6.1 shows the growth from 1920 to 1960 in the population totals for these two groups of regions, and the projections up to the year 2000 according to the "high", "low", and "medium" variants.

The projections indicate that the major share of the world population growth during the remainder of the present century can be expected to accrue to the less developed regions. According to the "medium" variant, their aggregate population would more than double, going from about 2,000 million in 1960 to more than 4,600 million in 2000. In comparison with this, the "low" variant indicates an increase smaller by about 500 million, and the "high" variant an increase more than 730 million greater.

In the more developed areas, the "medium" variant suggests an increase by 48 per cent from 1960 to 2000, from somewhat less than 1,000 million to 1,441 million, while the "low" variant would amount to 148 million less and the "high" variant about 133 million more in the year 2000.

The projected decennial rates of increase in the less developed regions are, in general, more than twice as high as those in the more developed ones. For the world as a whole, the increases for decennial periods between 1960 and 2000 are estimated between 14 and 25 per cent; for the more developed areas, in the range of 4-13 per cent, but for the less developed segment, 17-30 per cent.

As early as the 1930's, the two segments of world population began to differentiate themselves by their rates of growth. In the more developed parts of the world, the population growth rate diminished in the 1930's, the decennial increase falling from 13 per cent in the 1920's to 8 per cent in 1930-1940 and about 4 per cent in 1940-1950. In the 1950's, a renewed acceleration occurred, resulting in a 14 per cent decennial increase. In the world's less developed segment, the rate of growth shows a tendency to rise in each successive decade, from 10 per cent in the 1920's to 12 per cent in the 1930's and 1940's and 22 per cent in the 1950's.

B. REDISTRIBUTION OF WORLD POPULATION

The divergence between population growth rates of the two principal world segments naturally affects their relative size within the world total, making for an increase in the share of the less developed segment at the expense of the more developed. Such a shift is apparent in the population estimates of the past forty years, and it is likely to continue. During 1930-1960, the proportion of world population inhabiting the more developed areas diminished from about 36 per cent to about 33 per cent. In the next forty years, according to the "medium" assumption, this proportion may fall as low as to 24 per cent

TABLE 6.1
Population of the more and less developed regions, 1920-2000

| Year | World | | More developed regions | | Less developed regions | |
|------------------------|-----------------------|-------------------------------|------------------------|-------------------------------|------------------------|-------------------------------|
| | Population (millions) | Decennial increase (per cent) | Population (millions) | Decennial increase (per cent) | Population (millions) | Decennial increase (per cent) |
| Past population growth | | | | | | |
| 1920 | 1,861 | | 674 | | 1,187 | |
| 1930 | 2,070 | 11 | 759 | 13 | 1,311 | 10 |
| 1940 | 2,296 | 11 | 822 | 8 | 1,474 | 12 |
| 1950 | 2,516 | 10 | 858 | 4 | 1,658 | 12 |
| 1960 | 2,998 | 19 | 976 | 14 | 2,022 | 22 |
| "Medium" variant | | | | | | |
| 1970 | 3,592 | 20 | 1,082 | 11 | 2,510 | 24 |
| 1980 | 4,330 | 21 | 1,194 | 10 | 3,136 | 25 |
| 1990 | 5,187 | 20 | 1,318 | 10 | 3,869 | 23 |
| 2000 | 6,129 | 18 | 1,441 | 9 | 4,688 | 21 |
| "Low" variant | | | | | | |
| 1970 | 3,545 | 18 | 1,070 | 10 | 2,475 | 22 |
| 1980 | 4,147 | 17 | 1,153 | 8 | 2,994 | 21 |
| 1990 | 4,784 | 15 | 1,234 | 7 | 3,550 | 19 |
| 2000 | 5,448 | 14 | 1,293 | 5 | 4,155 | 17 |
| "High" variant | | | | | | |
| 1970 | 3,659 | 22 | 1,102 | 13 | 2,557 | 26 |
| 1980 | 4,551 | 24 | 1,245 | 13 | 3,306 | 29 |
| 1990 | 5,690 | 25 | 1,402 | 13 | 4,288 | 30 |
| 2000 | 6,994 | 23 | 1,574 | 12 | 5,420 | 26 |

TABLE 6.2
Distribution of world population between more and less developed regions, 1920 to 2000

| Year | World total (millions) | More developed regions | | Less developed regions | |
|--|------------------------|------------------------|------------|------------------------|------------|
| | | Millions | Percentage | Millions | Percentage |
| A. Past population growth | | | | | |
| 1920 | 1,861 | 674 | 36.2 | 1,187 | 63.8 |
| 1930 | 2,070 | 759 | 36.7 | 1,311 | 63.3 |
| 1940 | 2,296 | 822 | 35.8 | 1,474 | 64.2 |
| 1950 | 2,516 | 858 | 34.1 | 1,658 | 65.9 |
| 1960 | 2,998 | 976 | 32.6 | 2,022 | 67.4 |
| B. "Medium" variant | | | | | |
| 1960 | 2,998 | 976 | 32.6 | 2,022 | 67.4 |
| 1970 | 3,592 | 1,082 | 30.1 | 2,510 | 69.9 |
| 1980 | 4,330 | 1,194 | 27.6 | 3,136 | 72.4 |
| 1990 | 5,187 | 1,318 | 25.4 | 3,869 | 74.6 |
| 2000 | 6,129 | 1,441 | 23.5 | 4,688 | 76.5 |
| C. "High" variant for more developed regions "Low" variant for less developed regions | | | | | |
| 1960 | 2,998 | 976 | 32.6 | 2,022 | 67.4 |
| 1970 | 3,577 | 1,102 | 30.8 | 2,475 | 69.2 |
| 1980 | 4,239 | 1,245 | 29.4 | 2,994 | 70.6 |
| 1990 | 4,952 | 1,402 | 28.3 | 3,550 | 71.7 |
| 2000 | 5,729 | 1,574 | 27.5 | 4,155 | 72.5 |
| D. "Low" variant for more developed regions "High" variant for less developed regions | | | | | |
| 1960 | 2,998 | 976 | 32.6 | 2,022 | 67.4 |
| 1970 | 3,627 | 1,070 | 29.5 | 2,557 | 70.5 |
| 1980 | 4,459 | 1,153 | 25.9 | 3,306 | 74.1 |
| 1990 | 5,522 | 1,234 | 22.3 | 4,288 | 77.7 |
| 2000 | 6,713 | 1,293 | 19.3 | 5,420 | 80.7 |

(see table 6.2, sections A and B). But the outcome for the future does not seem so certain when the variant sets of projections are considered jointly. Conceivably, future trends in one group of areas might conform more nearly to the "high" variant and those in another group more nearly to the "low" variant. While such combinations of events are not particularly likely, they set certain limits to the inferences that can be made.

Combining the "high" variant for more developed areas and the "low" variant for less developed areas (table 6.2, section C) makes the share of the more developed areas fall to only about 28 per cent. The shift could be much greater, if the "low" variant were to materialize for more developed areas and the "high" variant for less developed ones (table 6.2, section D). In this event, the share of the more developed part would be reduced so much that it would have only 19 per cent of the world population at the end of the century.

According to the estimates, population increases in the major areas and regions have not been distributed in proportion to population size in the past, nor are they likely to be in the future. A comparison is made in table 6.3

of the major areas' shares in world population in 1960 with their shares in absolute increases in world population calculated for twenty-year periods in the past between 1920 and 1960 and in the future between 1960 and 2000. In view of the largely conjectural nature of previous estimates for East Asia and Africa, and the debatable assumptions underlying the "medium" variant of the projections, it is evident that the comparison is subject to much error. Nevertheless, extreme errors of estimate are not likely to be so large as to invalidate the following inferences.

Europe, the Soviet Union and Japan comprise a majority of the population of the more developed areas; they have had smaller shares in world population growth during 1940-1960 than their shares in world population. Furthermore, in accordance with the projections, their contributions to the world population growth of the more developed areas are likely to dwindle further. The opposite observation holds for the less developed areas except that in East Asia, despite the admittedly very uncertain estimates, population growth has probably been, and may continue to be, less than the area's share in world population.

TABLE 6.3
World population in 1960, estimated increase, 1920-1960; and increases expected according to the "medium" variant, 1960-2000, in more and less developed regions

| Area | Population 1960 | Estimated increase | | Projected increase | |
|--|--------------------|--------------------|-----------|--------------------|-----------|
| | | 1920-1940 | 1940-1960 | 1960-1980 | 1980-2000 |
| <i>Number millions</i> | | | | | |
| WORLD TOTAL | 2,998 | 433 | 702 | 1,332 | 1,799 |
| More developed regions | 977 | 146 | 155 | 217 | 247 |
| Europe | 425 | 53 | 45 | 55 | 48 |
| USSR | 214 | 40 | 19 | 63 | 75 |
| Northern America | 199 | 28 | 54 | 63 | 92 |
| Japan | 93 | 16 | 22 | 18 | 11 |
| Temperate South America | 33 | 7 | 11 | 13 | 14 |
| Australia and New Zealand | 12.7 | 2 | 4 | 5 | 7 |
| Less developed regions | 2,021 | 287 | 547 | 1,115 | 1,552 |
| South Asia | 865 | 140 | 255 | 555 | 750 |
| East Asia, excluding Japan | 701 | 65 | 138 | 229 | 235 |
| Africa | 273 | 48 | 81 | 176 | 319 |
| Latin America, excluding Temperate South America | 179 | 33 | 72 | 153 | 245 |
| Melanesia, Polynesia and Micronesia | 3.0 | 0.5 | 0.7 | 1.8 | 3 |
| Per cent of world total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| More developed regions | 32.6 | 33.9 | 22.0 | 16.3 | 13.7 |
| Europe | 14.2 | 12.3 | 6.4 | 4.1 | 2.6 |
| USSR | 7.2 | 9.1 | 2.8 | 4.8 | 4.2 |
| Northern America | 6.6 | 6.6 | 7.7 | 4.7 | 5.1 |
| Japan | 3.1 | 3.7 | 3.1 | 1.3 | 0.6 |
| Temperate South America | 1.1 | 1.7 | 1.5 | 1.0 | 0.8 |
| Australia and New Zealand | 0.4 | 0.5 | 0.6 | 0.4 | 0.4 |
| Less developed regions | 67.4 | 66.1 | 78.0 | 83.7 | 86.3 |
| South Asia | 28.8 | 32.3 | 36.4 | 41.7 | 41.7 |
| East Asia, excluding Japan | 23.4 | 15.0 | 19.6 | 17.2 | 13.1 |
| Africa | 9.1 | 11.2 | 11.6 | 13.2 | 17.1 |
| Latin America, excluding Temperate South America | 6.0 | 7.6 | 10.3 | 11.5 | 13.6 |
| Melanesia, Polynesia and Micronesia | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 |

The share in world population growth accruing to South Asia in recent decades has risen from apparently one-third to two-fifths, and the latter proportion may be nearly maintained for another three of four decades despite the large fertility declines assumed in the regional population projections for that area. On the other hand, Europe's share in world population growth, which was relatively substantial in the 1920's and 1930's, is apt to diminish and to become comparatively small. A large rise in the share of world population growth accruing to Africa is foreseen in the projections and a considerable rise is also anticipated in Latin America.

C. POPULATION DENSITY AND ITS CHANGES, 1960-1980

Population is very unevenly distributed over the world's habitable land areas. In the future, as a consequence of different rates of growth, the unevenness may become attenuated in some respects and accentuated in others.

In 1960, the regional average number of inhabitants per square kilometre ranged from 1.6 in Australia and New Zealand to 252 in Japan; the corresponding range indicated by the "medium" projections for 1980 is from 2.2 to 300 per square kilometre in the same two regions. This measure of density, it should be recognized, reflects very poorly the ratio of population to natural resources, as land areas differ greatly in their natural endowments; the nations also differ in the efficiency of their organization and technology for the utilization of available resources.

Map 2 and table 6.4 show the population densities in relation to land area in 1960 and 1980 according to "medium" estimates, for the more developed and less developed regions classified by two levels of density, "higher" density being distinguished where there are 40 or more inhabitants per square kilometre, while other regions are considered as being inhabited at "lower" density. The distinction is arbitrary, and has been made mainly because both in the more and the less developed regions, there is some

TABLE 6.4
Population density of 24 regions in 1960 and 1980 "medium" variant
Regions are classified by levels of density and economic development according to the projected situation in 1960

| Region and group | Area (thousand km ²) | Population (millions) | | Density (persons per km ²) | | Increase of population | | Increase of density |
|--|--|--------------------------|-------|--|------|------------------------------|-------------|---------------------------|
| | | 1960 | 1980 | 1960 | 1980 | Millions | Per cent | |
| WORLD TOTAL | 135,129 | 2,998 | 4,332 | 22 | 32 | 1,334 | 44 | 10 |
| I. More developed regions of low density | 56,014 | 459 | 604 | 8 | 11 | 145 | 32 | 3 |
| Australia and New Zealand | 7,973 | 12.7 | 17.7 | 1.6 | 2.2 | 5 | 38 | 0.6 |
| Temperate South America | 4,124 | 33 | 46 | 8 | 11 | 13 | 39 | 3 |
| Northern America | 21,515 | 199 | 262 | 9 | 12 | 63 | 32 | 3 |
| USSR | 22,402 | 214 | 278 | 10 | 12 | 64 | 30 | 2 |
| II. More developed regions of moderate density | 3,939 | 290 | 328 | 74 | 83 | 38 | 13 | 9 |
| Northern Europe | 1,636 | 76 | 81 | 46 | 50 | 5 | 7 | 4 |
| Southern Europe | 1,314 | 117 | 133 | 89 | 101 | 16 | 14 | 12 |
| Eastern Europe | 989 | 97 | 114 | 98 | 115 | 17 | 18 | 17 |
| III. More developed regions of high density | 1,362 | 228 | 263 | 167 | 193 | 35 | 15 | 26 |
| Western Europe | 992 | 135 | 152 | 136 | 153 | 17 | 13 | 17 |
| Japan | 370 | 93 | 111 | 252 | 300 | 18 | 19 | 48 |
| IV. Less developed regions of low density | 50,957 | 494 | 857 | 10 | 17 | 363 | 73 | 7 |
| Melanesia | 539 | 2.2 | 3.1 | 4 | 6 | 0.9 | 41 | 2 |
| Middle Africa | 6,607 | 28 | 41 | 4 | 6 | 13 | 46 | 2 |
| Southern Africa | 2,670 | 18 | 30 | 7 | 11 | 12 | 67 | 4 |
| Northern Africa | 8,484 | 66 | 116 | 8 | 14 | 50 | 76 | 6 |
| Tropical South America | 13,666 | 112 | 210 | 8 | 15 | 98 | 88 | 7 |
| Eastern Africa | 6,301 | 75 | 113 | 12 | 18 | 38 | 51 | 6 |
| Western Africa | 6,165 | 86 | 150 | 14 | 24 | 64 | 74 | 10 |
| South-West Asia | 3,968 | 59 | 102 | 15 | 26 | 43 | 73 | 11 |
| Middle American mainland | 2,512 | 47 | 90 | 19 | 36 | 43 | 91 | 17 |
| Polynesia and Micronesia | 45 | 0.9 | 1.7 | 20 | 38 | 0.8 | 89 | 19 |
| V. Less developed regions of moderate density | 22,598 | 1,480 | 2,200 | 65 | 97 | 720 | 49 | 32 |
| South-East Asia | 4,492 | 219 | 364 | 49 | 81 | 145 | 66 | 32 |
| Mainland East Asia | 11,097 | 654 | 850 | 59 | 77 | 196 | 30 | 18 |
| Middle South Asia | 6,774 | 587 | 954 | 87 | 141 | 367 | 63 | 54 |
| Caribbean | 235 | 20 | 32 | 85 | 136 | 12 | 60 | 50 |
| VI. Less developed regions of high density | | | | | | | | |
| Other East Asia | 259 | 47 | 80 | 181 | 309 | 33 | 70 | 128 |

break of continuity about that level of density so that, despite population growth, the same regions remain in these two density categories in 1960 and in 1980. By this criterion, four of the nine more developed regions are of "lower" density, and five have "higher" density; and of the fifteen less developed regions, the density of ten is "lower", and that of five is "higher".

The combined land areas of lower-density regions that are more developed and less developed are nearly the same: 56 and 51 million square kilometres, respectively. Higher-density regions which are more developed, on the other hand, extend only over 5 million square kilometres, as contrasted with 23 million square kilometres comprised by the less developed higher-density regions. It must be borne in mind, of course, that the regions include also to a varying extent those land areas, e.g., Arctic tundra, deserts, and mountainous terrain, which are unsuitable for more than the scantiest human habitation.

Fairly equal numbers of inhabitants were contained, in 1960, in three of these four types of regions, namely more developed regions of both density types, and less developed regions of lower density. The less developed regions of higher density, however, had more inhabitants than all the other regions combined and, in fact, more than one-half of the world's total population. As projected, this would also be the case in 1980, except that the population of presently less developed regions of lower density would then also be distinctly larger than that of more developed regions of each of the two density levels.

It is to be noted, on the other hand, that the projections foresee faster population increases in regions of lower density than in those of higher density, whether these be more developed, or less developed. Thus, among more developed regions, population increases between 1960 and 1980 are calculated as 32 per cent for those of lower density, and 14 per cent for those of higher density. Among the less developed regions, those of lower density would sustain an increase of 73 per cent, and those of higher density an increase of 49 per cent.

But though the disparity in expected population increases between regions of varied density is considerable, the disparity between more developed, and less developed regions, nevertheless, still is the wider one. Thus for all lower-density regions combined, whatever their level of development, population would increase between 1960 and 1980 from 953 to 1,461 million, that is by 53 per cent, while the combined population of the higher-density regions, with 2,045 million in 1960 and 2,871 million in 1980, would be augmented by 40 per cent during that time. In contrast, the combined population of more developed regions, whatever their density, would increase from 977 to 1,195 million, i.e., by 22 per cent; and that of the less developed regions from 2,021 to 3,137 million, which is by 55 per cent. In these two alternative combinations, the relatively heavy weight of the less developed higher-density regions, with over one-half the world's population, must be recognized.

Interest may also be attached to calculated absolute increases in density, as shown in the last column of table 6.4 and in map 3. Though the extent of problems related to productive investments is not measured by

any simple indicator, this particular measure does suggest that efforts necessary to accommodate additional individuals within given areas will probably have to be of rather diverse magnitude. Only 3 additional persons, in these terms, would have to be accommodated between 1960 and 1980 per square kilometre of land in the more developed regions of lower density, as compared with 7 individuals in less developed regions of lower density, 13 in more developed regions of higher density, and 33 in less developed regions of higher density. Though in diverse situations, in this respect requirements per unit of land appear of a similar magnitude in Eastern Europe, Western Europe, the Middle American mainland, and mainland East Asia, since in these regions 17-18 additional inhabitants per square kilometre may have to be expected between 1960 and 1980. At a distinctly higher level, appear the corresponding requirements in Japan, Middle South Asia, and the Caribbean, where the increase in density would be one of 48-54 persons per square kilometre of land, while per-land investments in the region of Korea and China (Taiwan) would probably have to be outstandingly large.

Despite these apparent contrasts, it must be emphasized that comparisons of population density provide, at best, only a rough partial indicator of the relative magnitude of various components of required developmental efforts in different regions. Among the figures that would be pertinent to such an assessment are not only the absolute and relative amounts of population increase, whether or not in relation to land area, but also natural resources, present levels of production per head, supplies of capital and skills, the forms of economic and social organization, details of the distribution of population within each region, and so forth. Furthermore, since it would not be sufficient to maintain a constant level of consumption in each region, the question of necessary amounts of improvement in levels of living in the different regions would enter into any such assessment. Nevertheless, an examination of the basic demographic components of the problem has some significance.

D. THE POPULATION OF THE CONTINENTS

The world's habitable land area is conventionally divided into five or six continents. (Prospects for the habitation of Antarctica by a large human population are remote.)¹ Population totals for these continents cannot be derived directly from the figures for the major areas and regions in the foregoing chapters. In the classification of eight major areas, the Americas are divided between Northern America and Latin America at the southern border of the United States, rather than between North and South America at the Isthmus of Panama. Hawaii, now an integral part of the United States, is included in Northern

¹ Antarctica is omitted from this scheme. However, the number of its residents has never exceeded 6 up to 1943. This number increased to 79 in 1950, 196 in 1955 and, because of the International Geophysical Year, to 902 in 1958; in 1960, the mean number of Antarctic residents was 666. Source: Juan Carlos M. Beltramino, "La población residente habitual de Antarctica Argentina, 1904-1960" (Buenos Aires, 1963) mimeographed). While the birth rate has remained nil up to the present, the crude death rate averaged 41.7 per 1,000 in 1905-1929, 3.5 per 1,000 in 1930-1959, and 1.5 per 1,000 in 1960. The increase in this population has been entirely a result of migration.

America instead of Oceania. Europe is so defined as to exclude the portion of the Soviet Union to the West of the Ural Mountains, traditionally considered as a part of the European continent, and the portion of Turkey detached from Asia Minor by the waterways between the Aegean and Black Seas is also excluded from Europe as defined in the classification of eight major areas. Asia (outside the Soviet Union but including the European portion of Turkey) is divided into the two major areas of East Asia and South Asia, though this large land mass is conventionally regarded as one continent. These departures from the conventional delimitation of continents seemed indicated in view of the greatly unequal size and the heterogeneity of the continental populations and the lack of coincidence between national boundaries and the conventional limits of some of the continents.²

To obtain conventional continental totals, the population estimates for the eight major areas are adjusted and re-combined as follows:

| <i>Continent</i> | <i>Major area</i> | <i>Adjustments</i> |
|--------------------------|-------------------------------------|--|
| AFRICA | AFRICA | (None) |
| AMERICA, NORTH | NORTHERN AMERICA | Adding totals for Middle America (mainland) and Caribbean region, and deducting total for Hawaii. |
| AMERICA, SOUTH | LATIN AMERICA | Deducting totals for Middle America (mainland) and Caribbean region |
| ASIA | EAST ASIA, and SOUTH ASIA | Adding totals for the Asian portion of the Soviet Union, and deducting totals for the European portion of Turkey |
| EUROPE | EUROPE | Adding totals for the European portions of the Soviet Union and Turkey |
| OCEANIA | OCEANIA | Adding total for Hawaii |

The adjustments involve population estimates for Hawaii and for the separate continental portions of the Soviet Union and Turkey. Also, data for the regions of Middle America and the Caribbean are subtracted from Latin America and added to North America. Only the future estimates corresponding to the "medium" variant of the projections are considered here.

(a) *Estimates for Hawaii and for the European portions of the Soviet Union and Turkey*

The population of *Hawaii*, statistically well documented, amounted to 261,000 in 1920; 368,000 in 1930; 428,000 in 1940; 491,000 in 1950; and 633,000 in 1960. As it is small in comparison with continental totals, detailed calculations are unwarranted in this context. Assuming that it will increase further at the average of the rates observed in the past four decades, and rounding the figures, one

² The United Nations has adopted the practice of allocating the western half of the island of New Guinea (now administered by Indonesia) to Asia and the eastern half (under Australian administration) to Oceania; while perhaps debatable, the convention is maintained in the present report.

obtains estimates of roughly 800,000 for 1970; 1 million for 1980; 1,250,000 for 1990; and 1,500,000 at the end of the century. Though these figures are not the result of a detailed projection, they are adequate for the adjustment of continental totals.

The boundary between Europe and Asia within the *Soviet Union* has been variously defined in the course of time and has been affected by changes in the boundaries of major administrative divisions. With the development of internal transport, the decentralization of economic development, and the interpenetration of national cultures, the division of the Soviet Union into a European and an Asian portion has lost much of the significance it may once have had. Rough estimates for the population of the Asian portion may suffice here, the corresponding estimates for the European portion being obtained by subtraction from the totals for the Soviet Union. The Asian portion of the Soviet Union is defined here as comprising the Kazakh, Kirgiz, Tadzhik, Turkmen and Uzbek Union

Republics, and the following major divisions of the Federated Russian Republic: the Altay, Krasnoyarsk, Primorskiy, and Knabarovsk Regions; the Oblasts of Amur, Irkutsk, Kamchatka, Kemerovo, Kurgan, Magadan, Novosibirsk, Omsk, Sakhalin, Tomsk, Tuva, Tyumen, and Chita; and the Buryat and Yakut Autonomous Republics.³ A population of 46,536,000 was enumerated in these areas at the 1959 census, and annual population estimates for the divisions listed above appear in recent statistical yearbooks and other compendia of the Soviet Union. From the results of the censuses taken in 1897, 1926 and 1939, and population estimates for 1911, after adjustment for areas not included (Southern Sakhalin and, at an earlier time, Bokhara, Khiva and Tuva), population estimates for approximately the same area are obtained for those dates, and the results are interpolated and extrapolated to obtain estimates for 1920, 1930 and so forth. Since the estimates have a varying extent of reliability, it is preferable to substitute rounded figures. Thus the following rough estimates are obtained: 22.5 million in 1920,

³ This definition excludes the three Union Republics of the Transcaucasus, namely, Azerbaijan SSR, Georgian SSR and Armenian SSR, which were frequently regarded as a part of the Asiatic part of USSR.

30 million in 1930, 35 million in 1940, 37.5 million in 1950, and 48.6 million in 1960. When these are subtracted from totals for the Soviet Union (see chapter 13), the population of the European portion is estimated as follows: 132.8 million in 1920, 149 million in 1930, 160 million in 1940, 142.5 million in 1950, and 165.8 million in 1960. The proportion of the Soviet Union's population contained in the Asian portion has risen from an estimated 14.5 per cent in 1920 to an estimated 22.7 per cent in 1960. Part of this rise has been due to migration and part to a higher rate of natural increase in the Asian than in the European portion. Without a detailed evaluation of pros-

pects in these respects, it seems reasonable to expect that the share of the Asian regions in the Soviet Union's population will continue to increase at an average rate comparable to that of past decades; current annual population estimates suggest that this tendency prevails at the present time. Linear continuation of the estimated trend would bring the percentage of population in Asian regions to 24.75 by 1970; 26.8 by 1980; 28.85 by 1990; and 30.9 by the year 2000. When these percentages are applied to the «medium» future population estimates for the Soviet Union, the following population estimates for the two portions of the country are indicated (millions):

| | 1960 | 1970 | 1980 | 1990 | 2000 |
|----------------------------|-------|-------|-------|-------|-------|
| USSR (total) | 214.4 | 245.7 | 277.8 | 316.1 | 353.1 |
| European portion | 165.8 | 184.7 | 203.8 | 225.1 | 245.1 |
| Asian portion | 48.6 | 61.0 | 74.0 | 91.0 | 108.0 |

For *Turkey*, the results of the censuses taken between 1927 and 1960 show the population in the Asiatic and European portions, but no accurate estimate is available for 1920. Earlier in the century, the population of an area roughly coincident with present Turkey in Europe was estimated as 1,407,000, and this figure is retained here for 1920. The population of European Turkey was reduced during the 1920's by population exchanges with Greece. The estimate for 1930 has been interpolated from census figures for 1927 and 1935, and the following series of population estimates has been arrived at: 1,407,000 in 1920; 1,125,000 in 1930; 1,551,000 in 1940; 1,584,000 in 1950; and 2,285,000 in 1960. In recent periods, roughly 8 per cent of the population of Turkey was found in the European portion and there are no evident reason for

assuming that this percentage will change substantially in the future. When this percentage is applied to the "medium" future estimates for Turkey, the population in the European portion is estimated to grow to 2,900,000 by 1970; 3,800,000 by 1980; 5 million by 1990; and 6 million by the year 2000. These estimates are very rough but as the population is comparatively small they are adequate for the adjustment of continental totals.

(b) *Resulting continental totals*

When the estimates are adjusted and re-grouped, past population growth and "medium" future estimates for the continents appear as shown in table 6.5.

TABLE 6.5
Area and population of continents, 1920-2000 "medium" projections

| Year | World total | Africa | North America | South America | Asia | Europe | Oceania |
|---------------------|---|--------|---------------|---------------|-------|--------|---------|
| | <i>Area (millions of square kilometres)</i> | | | | | | |
| | 135.2 ^a | 30.2 | 24.3 | 17.8 | 43.8 | 10.5 | 8.6 |
| | <i>Population (millions)</i> | | | | | | |
| 1920 | 1,862 | 143 | 145 | 60 | 1,044 | 461 | 8.8 |
| 1930 | 2,069 | 164 | 168 | 73 | 1,149 | 505 | 10.4 |
| 1940 | 2,296 | 191 | 185 | 89 | 1,278 | 541 | 11.5 |
| 1950 | 2,516 | 222 | 217 | 111 | 1,417 | 536 | 13.2 |
| 1960 | 2,998 | 273 | 265 | 145 | 1,706 | 593 | 16.3 |
| 1970 | 3,592 | 346 | 316 | 193 | 2,076 | 642 | 19.5 |
| 1980 | 4,330 | 449 | 383 | 256 | 2,532 | 687 | 23.6 |
| 1990 | 5,188 | 587 | 470 | 333 | 3,036 | 734 | 28.3 |
| 2000 | 6,129 | 768 | 568 | 422 | 3,560 | 778 | 33.4 |
| | <i>Decennial increase (per cent)</i> | | | | | | |
| 1920-1930 | 11 | 15 | 16 | 21 | 10 | 10 | 19 |
| 1930-1940 | 11 | 17 | 10 | 21 | 11 | 7 | 10 |
| 1940-1950 | 10 | 16 | 17 | 24 | 11 | -1 | 15 |
| 1950-1960 | 19 | 23 | 22 | 31 | 20 | 11 | 24 |
| 1960-1970 | 20 | 27 | 19 | 33 | 22 | 8 | 19 |
| 1970-1980 | 21 | 30 | 21 | 32 | 22 | 7 | 21 |
| 1980-1990 | 20 | 31 | 23 | 30 | 20 | 7 | 20 |
| 1990-2000 | 18 | 31 | 21 | 27 | 17 | 6 | 18 |

^a Sum of rounded figures.

Chapter 7

CRUDE VITAL RATES AND AGE STRUCTURE

A. VITAL RATES ACCORDING TO THE "MEDIUM" VARIANT

Tables 7.1, 7.2 and 7.3 show crude birth rates, death rates, and rates of natural increase, implied in the "medium" variant, as calculated initially for each region before applying any adjustments with respect to migration.¹ The same reservations apply as stated in annex 2. Of course, the future changes in crude vital rates are merely reflections of the assumptions made for each region, and it would be unreasonable to expect that future demographic changes will permit actual trends to proceed so smoothly.

These rates were calculated as follows:

Rates of natural increase. Exponential rates of growth (ρ) were calculated from population totals as projected initially without adjustment for migration. Growth according to the exponential rate is represented by the formula $B = Ae^{\rho t}$, where A and B are the population totals at the beginning and end of the respective period, e is the base of natural logarithms (2.7183), and t the length of the period in years. Putting $t = 5$ in this formula (for five-year periods) one determines ρ as equal to 0.460517 times $\log_{10} (B/A)$. The results were multiplied by 1,000 so as to yield rates per 1,000.

Crude birth rates. One-fifth the number of births of each period (calculated in most projections by assumed sex-age adjusted birth rates) was divided by the arithmetic mean population of each period and multiplied by 1,000.

Crude death rates. These were obtained by subtraction of rates of natural increase from crude birth rates as calculated by the above procedures.

For Northern America, the crude birth and death rates in the original population projection for the United States were taken as calculated by the United States Bureau of the Census,² an adjustment being made to allow for somewhat different birth rates and death rates in Canada.

For Australia and New Zealand, the calculations for tables 7.1 to 7.3 deviate somewhat from the original projection used (a projection for Australia in which mortality at the 1957-1959 level had been assumed constant up to 1975). For the purpose of table 7.2 it was assumed that expectation of life at birth would rise continuously to

attain 73.9 years by 1975 and then stay at that level, and regional crude death rates were calculated with age-specific mortality rates of the corresponding United Nations model life tables applied to the projected numbers of population in each sex-age group in the combined region. By reserve-survival of projected numbers of children aged 0-4 years, also with the corresponding model life tables, comparable birth rates were determined for table 7.1.

The rates of natural increase for Northern America, and for Australia and New Zealand (table 7.3), were obtained by subtracting the calculated death rates from the calculated birth rates.

A strong contrast now exists between the more developed and the less developed regions, each taken as a group; in the latter, the birth rate is now double, the death rate more than double, and the rate of natural increase nearly double that of the former.

An attenuation of that contrast is implicit in the "medium" variants of the present projections. Thus, from 1960-1965 to 1995-2000 the birth rate for the combination of more developed regions might decrease slightly, from about 20 to 18 per 1,000; the death rate—owing to changes in age composition—might rise slightly, from somewhat less to somewhat more than 9 per 1,000; and the rate of natural increase might shrink from nearly 12 to less than 9 per 1,000. In the less developed regions, taken as a group, the birth rate would undergo a substantial decrease, from 40 to 28 per 1,000, the death rate would be halved, and the rate of natural increase would be reduced slightly, from 21 to 19 per 1,000.

The sharp reduction projected in the crude death rate of less developed regions, to an eventual level no higher than that of the more developed regions, is rendered possible by the projected persistent youthful age composition in the regions of higher birth rates, despite projected death risks which, age group by age group, remain higher in the less developed regions. Because of this interplay between death risks and age composition, crude death rates, now lowest in the Soviet Union, eventually would be lowest in Latin America, in Europe they would eventually be rising and become comparatively high. As a net result of all the projected changes, Africa's rate of natural increase would, with time, come to surpass those of South Asia and Latin America, while Europe would remain the major area where natural increase in the lowest.

Despite decreases in vital rates, the numbers of vital events would continue rising in an increasing population. In 1960, the number of births in the world totalled perhaps about 100 million, and in the year 2000 there might be

¹ For Northern America, and for Australia and New Zealand, on the other hand, original projections were used in which net immigration was assumed on a larger scale than retained in the "high," "low" and "medium" variants of the regional projections. For those two regions, the vital rates shown in tables 7.1 to 7.3 are those corresponding to the original projections, prior to adjustment for a smaller net immigration.

² *Projections of the Population of the United States by Age and Sex to 1985* (Current Population Reports), Series P-25, No. 279 (4 February 1964), (Washington, D.C., United States Bureau of the Census, Government of the United States).

TABLE 7.1

Crude birth rates implied in "medium" variant for the world, more and less developed regions, major areas and regions, 1960-2000, no adjustment being made in respect of migration (per 1,000 population)

| Area | 1960-1965 | 1965-1970 | 1970-1975 | 1975-1980 | 1980-1985 | 1985-1990 | 1990-1995 | 1995-2000 |
|---------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| WORLD TOTAL ^a | 33.9 | 32.9 | 32.4 | 31.6 | 29.9 | 28.5 | 26.9 | 25.7 |
| (a) More developed | 20.0 | 18.5 | 18.7 | 19.4 | 19.3 | 19.0 | 18.5 | 18.3 |
| (b) Less developed ^a | 40.4 | 39.4 | 38.2 | 36.5 | 33.9 | 31.8 | 29.7 | 28.0 |
| A. East Asia ^d | 32.6 | 30.7 | 29.3 | 27.3 | 24.8 | 22.9 | 21.3 | 19.9 |
| (1) Mainland region ^c | 34.3 | 32.3 | 30.6 | 28.2 | 25.7 | 23.8 | 22.0 | 20.4 |
| (2) Japan | 17.0 | 15.6 | 16.7 | 16.8 | 15.2 | 13.6 | 13.0 | 13.2 |
| (3) Other East Asia ^d | 40.0 | 37.5 | 34.6 | 31.8 | 29.2 | 26.5 | 24.2 | 23.3 |
| B. South Asia ^d | 43.0 | 42.1 | 40.8 | 38.6 | 35.0 | 32.3 | 29.3 | 26.9 |
| (4) Middle South Asia | 43.6 | 43.1 | 42.0 | 39.2 | 34.5 | 31.2 | 27.7 | 25.0 |
| (5) South-East Asia | 41.9 | 39.5 | 37.5 | 36.7 | 35.8 | 34.4 | 32.5 | 30.4 |
| (6) South-West Asia ^d | 41.2 | 41.4 | 41.0 | 39.6 | 37.3 | 34.7 | 31.9 | 29.9 |
| C. Europe | 17.8 | 16.6 | 16.3 | 16.4 | 16.5 | 16.4 | 16.1 | 15.9 |
| (7) Western Europe | 17.1 | 16.0 | 15.7 | 15.8 | 16.1 | 16.3 | 16.2 | 16.0 |
| (8) Southern Europe | 19.0 | 17.7 | 17.0 | 16.8 | 16.7 | 16.5 | 16.2 | 16.0 |
| (9) Eastern Europe | 18.2 | 16.9 | 16.8 | 17.2 | 17.2 | 16.8 | 16.2 | 15.9 |
| (10) Northern Europe | 16.6 | 15.7 | 15.6 | 15.9 | 16.0 | 15.9 | 15.8 | 15.8 |
| D. (11) USSR | 22.1 | 19.4 | 19.0 | 19.9 | 21.0 | 20.7 | 20.0 | 19.3 |
| E. Africa | 45.5 | 45.4 | 45.1 | 44.6 | 43.4 | 42.2 | 41.1 | 40.0 |
| (12) Western Africa | 52.0 | 51.0 | 49.9 | 49.0 | 48.2 | 48.3 | 48.2 | 47.8 |
| (13) Eastern Africa | 41.7 | 42.3 | 42.8 | 43.0 | 42.6 | 41.8 | 41.4 | 41.4 |
| (14) Middle Africa | 40.0 | 40.7 | 41.1 | 41.4 | 41.2 | 40.9 | 40.9 | 41.1 |
| (15) Northern Africa | 44.1 | 43.9 | 43.5 | 42.1 | 39.0 | 35.4 | 32.1 | 28.8 |
| (16) Southern Africa | 42.8 | 42.7 | 42.5 | 42.3 | 42.1 | 41.0 | 38.0 | 34.4 |
| F. (17) Northern America ^f | 22.6 | 21.3 | 22.6 | 23.6 | 23.4 | 23.0 | 22.4 | 22.2 |
| G. Latin America | 39.6 | 39.0 | 38.2 | 37.2 | 35.3 | 33.6 | 31.9 | 30.3 |
| (18) Tropical South America | 41.9 | 41.2 | 40.1 | 38.8 | 37.2 | 35.2 | 33.2 | 31.0 |
| (19) Middle America (mainland) | 43.6 | 42.8 | 41.8 | 40.8 | 39.3 | 36.9 | 34.7 | 32.6 |
| (20) Temperate South America | 26.4 | 25.5 | 24.4 | 23.5 | 22.4 | 21.2 | 20.9 | 21.0 |
| (21) Caribbean | 38.3 | 38.2 | 37.4 | 36.1 | 34.4 | 32.4 | 30.4 | 28.4 |
| H. Oceania ^g | 25.0 | 24.4 | 24.7 | 25.5 | 25.7 | 25.4 | 25.2 | 25.3 |
| (22) Australia and New Zealand | 22.3 | 21.5 | 21.8 | 22.8 | 22.9 | 22.6 | 22.1 | 22.1 |
| (23) Melanesia ^g | 40.0 | 40.7 | 41.1 | 41.4 | 41.2 | 40.9 | 40.9 | 41.1 |

^a Not including areas listed in footnotes *b*, *e*, and *g*.

^b Not including Hong Kong, Mongolia, Macao, and Ryukyu Islands.

^c Mainland China only.

^d Not including Ryukyu Islands.

^e Not including Israel and Cyprus.

^f Corresponding to immigration assumption made in original projections.

^g Not including Polynesia and Micronesia.

^h Assumed same as Middle Africa.

some 150 million births. The annual number of deaths, perhaps nearly 50 million in 1960, would presumably also increase, though only in a comparatively slight proportion. Consequently, though at a decreasing rate, world population is nevertheless most likely to continue growing by increasing amounts up to the end of the century, if not also well into the next century. But the accuracy of such comparative forecasts is quite elusive since even the present vital rates are only inaccurately known for large segments of the world's population.

B. CHANGES OF AGE STRUCTURE ACCORDING TO THE "MEDIUM" VARIANT

The changes in vital rates discussed above more or less determine the age composition of population and, in turn,

are influenced by it. Table 7.4 presents the distribution by broad age groups of the population calculated on the basis of the "medium" projection up to 2000 (for details, see annex 2).

In the 1960 population of the various regions, children under 15 years of age constituted from 24 to 46 per cent, persons over 65 years from 2 to 11 per cent, and population in active ages (15-64 years) between 51 and 65 per cent of the total population.

In the year 2000, according to the projections, the proportion of children under 15 years of age would vary from 19 to 46 per cent, persons over 65 years of age from a little more than 2 per cent to about 13 per cent, and population in active age from 51 to 67 per cent of the total population in the different regions.

The two population types, discussed already at the beginning of chapter 1, can be clearly distinguished by the levels and trends in age composition, as calculated in the "medium" variant. In the more developed regions, the share of children would be reduced from about 29 to 26 per cent of the population during the period 1960-2000, the percentage of old persons would increase from 8 to more than 11 per cent, and the percentage of population aged 15-64 would fluctuate about the level of 63 per cent. In the less developed regions, the percentage of children would diminish from 40 to 35, that of older persons would rise from 3 to 5, and the proportion of population in the active ages of 15-64 would increase from 57 to 61 per cent. As projected, changes in age composition in the more developed areas would be appreciable during 1960-1980, and thereafter only slight. In the less developed areas, the changes would be slight until 1980, and more important only in the last two decades of this century. Despite such contrast between the two sets of areas, significant diversity can also be noted in trends

of age composition among particular areas in each of the two groups.

Among the more developed areas, Europe would maintain a comparatively low, and Northern America and Oceania a comparatively high, percentage of children; the percentage of children would decrease considerably in Japan, and appreciably in the Soviet Union and Temperate South America, whereas in other more developed areas the change would be rather slight. The percentages of persons in the economically active ages, in these areas, are calculated to stay mostly in the range of 60-65 per cent for the remainder of the century, but in the intervening period this percentage may rise exceptionally high in Japan. The percentage of older persons is estimated to rise considerably and continuously in Japan and the Soviet Union, while in Europe the rise in that percentage would be halted about 1980, and in Northern America and Oceania the proportion of older persons would undergo least change throughout the forty-year period of the projections.

TABLE 7.2

Crude death rates implied in "medium" variant for the world, more and less developed regions, major areas and regions, 1960-2000, no adjustment being made in respect of migration (per 1,000 population)

| Area | 1960-1965 | 1965-1970 | 1970-1975 | 1975-1980 | 1980-1985 | 1985-1990 | 1990-1995 | 1995-2000 |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| WORLD TOTAL ^a | 15.9 | 14.4 | 13.6 | 12.8 | 11.5 | 10.7 | 9.9 | 9.3 |
| (a) More developed regions | 8.6 | 8.5 | 8.6 | 9.0 | 9.1 | 9.2 | 9.4 | 9.6 |
| (b) Less developed regions | 19.2 | 17.3 | 15.7 | 14.4 | 12.5 | 11.2 | 10.0 | 9.2 |
| A. East Asia | 18.9 | 17.1 | 15.7 | 14.3 | 13.0 | 12.0 | 11.3 | 10.5 |
| (1) Mainland region | 21.0 | 19.0 | 17.5 | 15.8 | 14.4 | 13.2 | 12.1 | 11.2 |
| (2) Japan | 8.0 | 7.7 | 7.7 | 7.8 | 7.9 | 8.3 | 9.2 | 10.2 |
| (3) Other East Asia | 11.0 | 9.5 | 8.2 | 7.0 | 6.1 | 5.5 | 5.2 | 5.0 |
| B. South Asia | 18.9 | 17.0 | 15.5 | 14.1 | 11.6 | 10.2 | 8.9 | 7.9 |
| (4) Middle South Asia | 20.3 | 18.4 | 16.9 | 15.5 | 12.5 | 11.1 | 9.7 | 8.5 |
| (5) South-East Asia | 15.9 | 14.0 | 12.5 | 11.2 | 9.9 | 8.5 | 7.4 | 6.4 |
| (6) South-West Asia | 15.8 | 14.0 | 12.3 | 10.8 | 9.4 | 8.5 | 7.4 | 6.8 |
| C. Europe | 10.0 | 9.9 | 10.1 | 10.4 | 10.7 | 11.0 | 11.1 | 11.2 |
| (7) Western Europe | 10.7 | 10.8 | 10.9 | 11.4 | 11.8 | 12.0 | 11.8 | 11.5 |
| (8) Southern Europe | 9.7 | 9.5 | 9.4 | 9.2 | 9.3 | 9.9 | 10.3 | 10.8 |
| (9) Eastern Europe | 8.9 | 9.2 | 9.3 | 9.5 | 10.0 | 10.2 | 10.3 | 10.7 |
| (10) Northern Europe | 10.5 | 10.3 | 10.9 | 11.5 | 11.9 | 12.2 | 12.3 | 12.1 |
| D. (11) USSR | 7.2 | 7.1 | 7.1 | 7.3 | 7.8 | 8.1 | 8.5 | 8.7 |
| E. Africa | 22.5 | 20.9 | 19.5 | 18.1 | 16.7 | 15.4 | 14.2 | 13.1 |
| (12) Western Africa | 25.1 | 23.5 | 21.8 | 20.4 | 19.0 | 17.9 | 16.4 | 15.7 |
| (13) Eastern Africa | 24.0 | 22.7 | 21.6 | 20.4 | 19.1 | 18.0 | 16.8 | 15.8 |
| (14) Middle Africa | 24.7 | 23.5 | 22.0 | 20.9 | 19.6 | 18.4 | 17.2 | 16.2 |
| (15) Northern Africa | 17.5 | 15.8 | 14.2 | 12.6 | 10.9 | 9.3 | 7.9 | 6.9 |
| (16) Southern Africa | 17.9 | 17.1 | 16.2 | 15.5 | 14.3 | 12.7 | 11.0 | 9.4 |
| F. (17) Northern America | 9.2 | 9.4 | 9.4 | 9.2 | 8.0 | 8.0 | 7.9 | 7.9 |
| G. Latin America | 11.2 | 9.9 | 9.1 | 8.4 | 7.2 | 6.9 | 6.4 | 6.2 |
| (18) Tropical South America | 10.9 | 9.6 | 8.9 | 8.2 | 7.6 | 7.0 | 6.6 | 6.0 |
| (19) Middle America (mainland) | 11.6 | 9.8 | 8.1 | 6.8 | 6.2 | 5.7 | 5.2 | 5.0 |
| (20) Temperate South America | 9.2 | 9.0 | 8.9 | 8.8 | 8.4 | 8.7 | 8.8 | 8.5 |
| (21) Caribbean | 14.9 | 13.9 | 12.9 | 11.9 | 10.9 | 9.9 | 9.0 | 8.4 |
| H. Oceania | 10.8 | 10.0 | 9.5 | 9.5 | 9.5 | 9.5 | 9.7 | 9.6 |
| (22) Australia and New Zealand | 8.5 | 7.8 | 7.4 | 7.4 | 7.7 | 8.0 | 8.1 | 8.2 |
| (23) Melanesia | 24.7 | 23.5 | 22.0 | 20.9 | 19.5 | 18.4 | 17.3 | 16.2 |

^a For qualifying observations, see footnotes to table 7.1.

TABLE 7.3

Rates of natural increase implied in "medium" variant for the world, more and less developed regions, major areas and regions, 1960-2000, no adjustment being made in respect of migration (per 1,000 population)

| Area | 1960-1965 | 1965-1970 | 1970-1975 | 1975-1980 | 1980-1985 | 1985-1990 | 1990-1995 | 1995-2000 |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| WORLD TOTAL ^a | 18.0 | 18.5 | 18.8 | 18.8 | 18.4 | 17.8 | 17.0 | 16.4 |
| (a) More developed regions | 11.5 | 10.0 | 10.1 | 10.4 | 10.2 | 9.7 | 9.1 | 8.8 |
| (b) Less developed regions | 21.2 | 22.1 | 22.5 | 22.1 | 21.4 | 20.6 | 19.7 | 18.8 |
| A. East Asia | 13.7 | 13.6 | 13.6 | 13.0 | 11.8 | 10.9 | 10.0 | 9.4 |
| (1) Mainland region | 13.3 | 13.2 | 13.1 | 12.4 | 11.3 | 10.6 | 9.9 | 9.2 |
| (2) Japan | 9.0 | 7.9 | 9.0 | 9.0 | 7.3 | 5.3 | 3.8 | 3.0 |
| (3) Other East Asia | 29.0 | 28.0 | 26.4 | 24.8 | 23.1 | 21.0 | 19.0 | 18.3 |
| B. South Asia | 24.1 | 25.1 | 25.3 | 24.5 | 23.4 | 22.1 | 20.4 | 19.0 |
| (4) Middle South Asia | 23.3 | 24.7 | 25.1 | 23.7 | 22.0 | 20.1 | 18.0 | 16.5 |
| (5) South-East Asia | 26.0 | 25.5 | 25.0 | 25.5 | 25.9 | 25.9 | 25.1 | 24.0 |
| (6) South-West Asia | 25.4 | 27.4 | 28.7 | 28.8 | 27.9 | 26.2 | 24.5 | 23.1 |
| C. Europe | 7.8 | 6.7 | 6.2 | 6.0 | 5.8 | 5.4 | 5.0 | 4.7 |
| (7) Western Europe | 6.4 | 5.2 | 4.7 | 4.3 | 4.2 | 4.2 | 4.3 | 4.4 |
| (8) Southern Europe | 9.3 | 8.2 | 7.6 | 7.6 | 7.4 | 6.6 | 5.9 | 5.2 |
| (9) Eastern Europe | 9.3 | 7.7 | 7.5 | 7.7 | 7.2 | 6.6 | 5.9 | 5.2 |
| (10) Northern Europe | 6.1 | 5.4 | 4.7 | 4.4 | 4.1 | 3.7 | 3.5 | 3.7 |
| D. (11) USSR | 14.9 | 12.3 | 11.9 | 12.6 | 13.2 | 12.6 | 11.5 | 10.6 |
| E. Africa | 23.0 | 24.4 | 25.6 | 26.5 | 26.7 | 26.8 | 26.9 | 26.9 |
| (12) Western Africa | 26.9 | 27.5 | 28.1 | 28.6 | 29.2 | 30.4 | 31.8 | 32.1 |
| (13) Eastern Africa | 17.7 | 19.6 | 21.2 | 22.6 | 23.5 | 23.8 | 24.6 | 25.6 |
| (14) Middle Africa | 15.3 | 17.2 | 19.1 | 20.5 | 21.6 | 22.5 | 23.7 | 24.9 |
| (15) Northern Africa | 26.6 | 28.1 | 29.3 | 29.5 | 28.1 | 26.1 | 24.2 | 21.9 |
| (16) Southern Africa | 24.9 | 25.6 | 26.3 | 26.8 | 27.8 | 28.3 | 27.0 | 25.0 |
| F. (17) Northern America | 13.4 | 11.9 | 13.2 | 14.4 | 15.4 | 15.0 | 14.5 | 14.3 |
| G. Latin America | 28.4 | 29.1 | 29.1 | 28.8 | 28.1 | 26.7 | 25.5 | 24.1 |
| (18) Tropical South America | 31.0 | 31.6 | 31.2 | 30.6 | 29.6 | 28.2 | 26.6 | 25.0 |
| (19) Middle America (mainland) | 32.0 | 33.0 | 33.7 | 34.0 | 33.1 | 31.2 | 29.5 | 27.6 |
| (20) Temperate South America | 17.2 | 16.5 | 15.5 | 14.7 | 14.0 | 12.5 | 12.1 | 12.5 |
| (21) Caribbean | 23.4 | 24.3 | 24.5 | 24.2 | 23.5 | 22.5 | 21.4 | 20.0 |
| H. Oceania | 14.2 | 14.4 | 15.2 | 16.0 | 16.2 | 15.9 | 15.5 | 15.7 |
| (22) Australia and New Zealand | 13.8 | 13.7 | 14.4 | 15.4 | 15.2 | 14.6 | 14.0 | 13.9 |
| (23) Melanesia | 15.3 | 17.2 | 19.1 | 20.5 | 21.7 | 22.5 | 23.6 | 24.9 |

^aFor qualifying observations, see footnotes to table 7.1.

Among the less developed areas, the projected age composition would undergo least change in Africa where, as calculated, some of the highest proportions of children, and lowest proportions in adult and advanced ages, would be maintained. Starting with age compositions similar to that calculated in Africa, the projections for South Asia and Latin America indicate some change, slight until 1980 but more considerable thereafter, causing a significant decrease in the proportion of children, an appreciable rise in the proportion aged 15-64 years, and some rise also in the proportion of older persons. In East Asia, as calculated, the age composition of 1960 may already resemble that which South Asia and Latin America might attain by the end of the century, and the projection foresees further considerable reductions in the proportion of children, and augmentations at active and advanced ages, so that by the end of the century the structure of East Asia's population may come to resemble the current age composition of the combined group of more developed regions.

The conjectural character of the calculations, however, deserves emphasis particularly because for a majority of the populations of Africa and East Asia, even the current age composition could be estimated only very roughly.

The dependency ratio, as is shown in table 7.5, will tend to decrease in the world as a whole in the future, according to the projections. From approximately 700 dependents per 1,000 persons in the age group 15-64 in 1960, the "medium" projection shows this ratio falling to about 630 in 2000. In the more developed regions, it is estimated that the ratio will decrease from 586 in 1960 to 570 in 1980, but it may rise again during the next twenty years nearly to the same level of 1960. In the less developed regions, where the present dependency ratios are generally much higher, the projected future trend of the ratios is generally downward, but the changes indicated for the period 1960-2000 differ greatly among the major areas and component regions. While large de-

creases in the dependency ratios for East Asia and South Asia are forecast, the decrease indicated for Latin America is smaller, and little change is anticipated in Africa where the present dependency ratio is at the highest level.

Future changes in types of economic activity and corresponding social arrangements will depend very much on the opportunities which can be afforded for the younger segments of the population of working ages. This consideration makes it important to pay attention to variations of age structure within the 15-64 group, such as the percentages of persons aged 15-24 within that group which are also shown in table 7.5. In 1960, this proportion of young adults stood at about three-tenths of those aged 15-64 in the world as a whole, about one-quarter in the more developed regions, and about one-third in the less developed ones. In both groups of regions, the proportion may be slightly raised by 1980, and slightly reduced again towards the end of the century. Significant variations in the

rate of intake of younger persons may occur within shorter periods, which the figures of table 7.5 do not reflect.

In Japan, although the level of fertility has now fallen quite low, there is still a fairly high proportion of young adults in the population of working ages; this proportion will diminish very sharply in Japan during the 1960's and 1970's, according to the present calculations. By contrast, owing to past trends in birth rates, the proportion of young adults will rise in Northern America and Oceania, and to a lesser extent in the Soviet Union. The highest proportions of young adults at present appear in South-West Asia, Western and Northern Africa, and Middle America, and these are likely to persist for a considerable future time. In particular countries and at shorter time intervals, sharper fluctuations may occur, partly due to international migration; such fluctuations are not shown here but they can have considerable economic and social implications.

TABLE 7.4
Structure of the population by broad age groups according to the "medium" variant for the world, more and less developed regions, major areas and regions, 1960, 1980 and 2000 (percentage of total population in specified groups)

| Area | 0-14 years | | | 15-64 years | | | 65 years and over | | |
|--------------------------------|------------|------|------|-------------|------|------|-------------------|------|------|
| | 1960 | 1980 | 2000 | 1960 | 1980 | 2000 | 1960 | 1980 | 2000 |
| WORLD TOTAL ^a | 36.4 | 35.8 | 32.4 | 58.7 | 58.4 | 61.2 | 4.9 | 5.8 | 6.4 |
| (a) More developed regions | 28.7 | 25.5 | 25.6 | 63.0 | 63.7 | 63.0 | 8.3 | 10.8 | 11.4 |
| (b) Less developed regions | 40.1 | 39.7 | 34.6 | 56.6 | 56.4 | 60.6 | 3.3 | 3.9 | 4.8 |
| A. East Asia | 36.6 | 32.2 | 26.5 | 59.7 | 62.4 | 66.1 | 4.2 | 5.4 | 7.4 |
| (1) Mainland region | 36.4 | 32.8 | 26.8 | 59.5 | 62.0 | 66.3 | 4.1 | 5.2 | 6.9 |
| (2) Japan | 29.9 | 22.4 | 19.0 | 64.4 | 69.0 | 67.3 | 5.7 | 8.6 | 13.7 |
| (3) Other East Asia | 43.9 | 39.4 | 31.3 | 53.1 | 56.6 | 63.5 | 3.0 | 4.0 | 5.2 |
| B. South Asia | 41.0 | 41.7 | 34.6 | 55.9 | 54.7 | 60.9 | 3.1 | 3.6 | 4.6 |
| (4) Middle South Asia | 40.9 | 42.0 | 32.7 | 56.0 | 54.5 | 62.7 | 3.1 | 3.5 | 4.6 |
| (5) South-East Asia | 40.7 | 40.5 | 38.0 | 56.2 | 55.6 | 57.4 | 3.1 | 3.9 | 4.6 |
| (6) South-West Asia | 43.7 | 42.8 | 37.3 | 53.4 | 54.0 | 58.7 | 2.9 | 3.2 | 4.0 |
| C. Europe | 25.7 | 23.0 | 22.9 | 64.5 | 63.9 | 64.0 | 9.8 | 13.1 | 13.1 |
| (7) Western Europe | 23.8 | 22.5 | 23.0 | 65.0 | 63.0 | 63.7 | 11.2 | 14.5 | 13.3 |
| (8) Southern Europe | 27.1 | 23.6 | 22.9 | 64.7 | 65.3 | 63.9 | 8.2 | 11.1 | 13.2 |
| (9) Eastern Europe | 28.3 | 23.5 | 23.0 | 63.3 | 64.1 | 64.4 | 8.4 | 12.4 | 12.6 |
| (10) Northern Europe | 24.1 | 22.4 | 22.7 | 64.6 | 62.9 | 64.0 | 11.3 | 14.7 | 13.3 |
| D. (11) USSR | 30.8 | 26.1 | 27.1 | 63.0 | 64.4 | 61.7 | 6.2 | 9.5 | 11.2 |
| E. Africa | 43.1 | 43.6 | 42.3 | 54.2 | 53.6 | 54.5 | 2.7 | 2.8 | 3.2 |
| (12) Western Africa | 46.1 | 46.1 | 46.5 | 51.8 | 51.7 | 51.1 | 2.1 | 2.2 | 2.4 |
| (13) Eastern Africa | 41.7 | 41.3 | 41.9 | 55.5 | 55.7 | 54.7 | 2.8 | 3.0 | 3.4 |
| (14) Middle Africa | 38.1 | 40.2 | 41.6 | 58.4 | 56.1 | 54.6 | 3.5 | 3.7 | 3.8 |
| (15) Northern Africa | 43.2 | 43.9 | 37.1 | 53.9 | 53.0 | 59.1 | 2.9 | 3.1 | 3.8 |
| (16) Southern Africa | 42.2 | 42.8 | 40.9 | 54.7 | 54.0 | 55.5 | 3.1 | 3.2 | 3.6 |
| F. (17) Northern America | 31.3 | 29.9 | 29.8 | 59.7 | 60.7 | 61.3 | 9.0 | 9.4 | 8.9 |
| G. Latin America | 41.7 | 42.1 | 38.0 | 55.0 | 53.9 | 57.7 | 3.3 | 3.9 | 4.3 |
| (18) Tropical South America | 43.1 | 43.6 | 38.8 | 54.2 | 52.9 | 57.3 | 2.7 | 3.5 | 3.9 |
| (19) Middle America (mainland) | 45.5 | 45.3 | 40.5 | 51.1 | 51.5 | 56.0 | 3.4 | 3.2 | 3.5 |
| (20) Temperate South America | 32.5 | 30.7 | 27.9 | 62.6 | 61.9 | 63.2 | 4.9 | 7.4 | 8.9 |
| (21) Caribbean | 39.9 | 40.0 | 35.5 | 56.2 | 55.9 | 59.8 | 3.9 | 4.1 | 4.7 |
| H. Oceania | 31.7 | 30.8 | 31.6 | 60.5 | 60.9 | 59.9 | 7.8 | 8.3 | 8.5 |
| (22) Australia and New Zealand | 30.6 | 29.1 | 29.6 | 60.9 | 61.8 | 61.0 | 8.5 | 9.1 | 9.4 |
| (23) Melanesia | 38.1 | 40.2 | 41.6 | 58.4 | 56.1 | 54.6 | 3.5 | 3.7 | 3.8 |

^a See explanation in annex 2.

TABLE 7.5

Dependency ratios according to "medium" variant for the world, more and less developed regions, major areas and regions, 1960, 1980 and 2000

| Area | Dependency ratio ^b | | | Persons aged 15-24 per 100 persons aged 15-64 | | |
|--|-------------------------------|-------|-------|---|------|------|
| | 1960 | 1980 | 2000 | 1960 | 1980 | 2000 |
| WORLD TOTAL ^a | 704.4 | 711.9 | 634.2 | 29.5 | 31.4 | 30.1 |
| (a) More developed regions | 586.4 | 570.5 | 588.3 | 24.1 | 25.4 | 24.7 |
| (b) Less developed regions | 768.2 | 773.4 | 649.1 | 32.4 | 34.1 | 31.8 |
| A. East Asia | 675.0 | 603.8 | 512.2 | 29.9 | 29.9 | 26.0 |
| (1) Mainland region | 681.1 | 612.7 | 508.6 | 29.7 | 30.7 | 26.2 |
| (2) Japan | 551.8 | 449.1 | 486.3 | 29.8 | 19.9 | 20.9 |
| (3) Other East Asia | 883.2 | 765.7 | 547.8 | 33.1 | 36.4 | 30.0 |
| B. South Asia | 790.2 | 826.5 | 642.4 | 32.9 | 35.3 | 32.8 |
| (4) Middle South Asia | 786.3 | 835.3 | 595.9 | 32.6 | 35.1 | 32.5 |
| (5) South-East Asia | 780.4 | 797.0 | 743.7 | 32.9 | 35.6 | 33.3 |
| (6) South-West Asia | 872.9 | 853.5 | 702.6 | 36.0 | 35.2 | 34.4 |
| C. Europe | 551.7 | 566.1 | 562.5 | 22.5 | 23.9 | 22.6 |
| (7) Western Europe | 540.2 | 586.8 | 568.6 | 21.9 | 23.9 | 22.3 |
| (8) Southern Europe | 545.2 | 530.6 | 564.6 | 24.2 | 23.9 | 22.6 |
| (9) Eastern Europe | 578.9 | 560.6 | 552.5 | 22.4 | 24.5 | 23.1 |
| (10) Northern Europe | 547.9 | 590.7 | 562.2 | 21.0 | 23.2 | 22.6 |
| D. (11) USSR | 588.4 | 552.1 | 622.0 | 25.7 | 27.0 | 25.6 |
| E. Africa | 843.5 | 865.6 | 832.2 | 35.7 | 35.6 | 35.7 |
| (12) Western Africa | 927.8 | 931.2 | 953.9 | 37.8 | 37.9 | 37.3 |
| (13) Eastern Africa | 801.4 | 794.7 | 827.6 | 34.9 | 33.8 | 34.9 |
| (14) Middle Africa | 713.4 | 783.0 | 831.3 | 32.5 | 32.4 | 34.5 |
| (15) Northern Africa | 852.4 | 888.8 | 692.4 | 35.6 | 35.6 | 34.4 |
| (16) Southern Africa | 828.5 | 852.4 | 800.9 | 35.0 | 35.1 | 35.6 |
| F. (17) Northern America | 676.2 | 645.7 | 631.3 | 22.9 | 28.3 | 27.9 |
| G. Latin America | 817.5 | 854.9 | 733.7 | 33.6 | 35.2 | 34.2 |
| (18) Tropical South America | 844.7 | 890.1 | 746.5 | 34.9 | 36.2 | 34.9 |
| (19) Middle America (mainland) | 953.1 | 939.6 | 784.3 | 35.6 | 37.9 | 36.4 |
| (20) Temperate South America | 599.3 | 616.9 | 583.4 | 27.3 | 28.0 | 26.6 |
| (21) Caribbean | 779.6 | 788.5 | 673.2 | 33.5 | 33.5 | 32.5 |
| H. Oceania | 652.4 | 641.3 | 668.9 | 24.3 | 27.7 | 28.6 |
| (22) Australia and New Zealand | 642.5 | 619.1 | 638.8 | 23.0 | 27.0 | 27.5 |
| (23) Melanesia | 713.1 | 782.4 | 832.0 | 32.4 | 32.4 | 34.5 |

^a See explanation in annex 2.

^b Persons under 15 years of age plus those 65 years and over per 1,000 persons aged 15-64.

Part III
BASIC DATA AND METHODS

Chapter 8

THE BASIC DATA

A. SOURCES OF DATA ON PAST AND CURRENT DEMOGRAPHIC CONDITIONS AND TRENDS

Wherever possible, use has been made in this report of data on population size, age composition, birth rates, death rates, gross reproduction rates, and expectation of life, obtained from official sources and published by the United Nations to date. The majority of these data have been taken from successive issues of the United Nations *Demographic Yearbook* up to 1962, *Population and Vital Statistics Report* (Statistical Papers, Series A), vol. XVI, No. 1 (data available as of 1 January 1964), and *Monthly Bulletin of Statistics* in the issue of January 1964. Where data from other sources have been used, the sources are cited in the text. The latest official total published has been used in most cases.¹

Numerous gaps and inconsistencies are found in the official data particularly for earlier dates. Such gaps have had to be filled and inconsistencies adjusted for the purpose of obtaining comparable data with respect to the same past dates for all countries of the world. Wherever such departures from published official data have been necessary, the fact is indicated in the chapter corresponding to the particular area and region. In a few instances, special calculations have had to be made as explained in the text.

For many parts of the world, the official demographic information is incomplete in a number of respects and analytical methods have been used to obtain estimates of the missing quantities. Where statistics on births and deaths are believed to be markedly incomplete or are missing, levels of fertility were often calculated by the method of reverse-survival from data on the age composition of the population; levels of mortality often had to be estimated by subtraction of the estimated rate of natural increase from the estimated birth rate. Conversely, where data or estimates on fertility and mortality were available, but official statistics on the population's age composition were either lacking or patently unreliable, an estimate of age composition was constructed corresponding to the fertility and mortality levels. Such estimates have been greatly facilitated by a system of population models representing various combinations of fertility and mortality levels.²

¹ Thus with only a few exceptions no attempt was made to substitute a modified total where the most recent census, or the official estimate based thereon, was believed deficient. While many recent estimates probably fall somewhat short of facts, it would not have been possible to make corresponding corrections by uniform or internationally comparable standards.

² A few of these models have been presented, and the interrelations between fertility, mortality and age composition described in *The Future Growth of World Population* (United Nations publications, Sales No.: 58.XIII.2).

Recent world-wide surveys of fertility and mortality have been carried out by the United Nations Secretariat, in which official data were supplemented by estimates.³ Unless otherwise noted, estimates of levels of fertility and mortality used in this report correspond to those published in the two above-mentioned surveys. A comparable survey of international migration has not yet been carried out. Various statistics relating to this subject are intermittently published in issues of the United Nations *Demographic Yearbook*, but the gaps in the data are very large and the definitions of categories of migrants, diverse and additional information from other sources have had to be used in many cases.

B. QUALITY OF DEMOGRAPHIC STATISTICS

Comprehensive systems for accurate recording of statistics on population size, age composition, births, deaths and, to some extent, migration exist in many countries, particularly within the more developed regions. In other regions, the systems of demographic statistics are generally not so complete and the accuracy of the data varies and cannot always be definitely evaluated. In some countries and regions, only fragmentary demographic data are available and their accuracy is difficult to verify; judging from experience elsewhere, accuracy is sometimes likely to be quite poor.

(a) Size of the population

Population censuses have been taken in most countries of the world although there are still sixteen countries in which this is not true. In the period 1958-1963, a comprehensive national census was taken in 157 out of a total of 229 countries and territories. In many countries, particularly in the more developed regions, periodic census-taking, usually once every ten years, is a long-established practice, and to an increasing extent this practice has been adopted in other parts of the world. In a number of countries, however, only a few censuses have been conducted at long intervals, and in several, only one census has been taken so far. The accuracy of censuses varies generally with their periodic frequency and with the length of procedural experience. In some countries, successive census results imply implausible or inconsistent

³ *Population Bulletin of the United Nations*, No. 6 (Sales No.: 62.XIII.2) (on mortality); and *Population Bulletin of the United Nations*, No. 7 (Sales No.: 64.XIII.2) (on fertility).

rates of population change which are presumptive evidence of errors in the data. The accuracy of some censuses has been tested by verifying samples or partial re-enumerations, but the practice has not become so wide-spread as to offer much basis for judgement on the possible extent of census errors in other countries.

In addition, data on population size and characteristics have been obtained in many countries by enumerations which do not conform to the technical standards of modern population censuses, such as voting registers, tax lists, counts of households, summary reports by village officials etc. Where such procedures have been replaced by modern censuses, it has usually been found that the population was considerably underestimated in the previous counts.

To determine size and structure of the population in areas where the shortage of means of communication and trained staff impedes an exhaustive enumeration, there has recently been an increasing use of scientifically designed sample surveys of households, carried out by comparatively small teams of trained enumerators. The results are likely to be superior to those of a full-scale enumeration carried out with less exacting standards. But in countries where the impediments to census-taking are less severe, the results of censuses taken subsequently to sample surveys have shown that in such surveys also, population tends to be underestimated.

With cumulated experience and the benefit of internationally recommended procedures, it can be presumed that in regions of hitherto modest statistical experience the most recent enumerations have, as a rule, been more accurate than earlier ones. Therefore, it is reasonable, in the majority of instances, to accept the most recent data or estimates as the best available and to adjust earlier ones when necessary for the sake of consistency.

Even in countries with a long census tradition, the detailed data often show evidence of large omission in the count of young children, sometimes also of adult women and occasionally of young men of military age or those engaged in migrant labour etc. The reported age composition then requires correction, but misunderstandings of comparison are best avoided if the figures on total population are retained, unless evidence of a severe deficiency is convincing. Of course, census results are subject to possible errors of over-statement as well as understatement.

(b) *Statistics on births, deaths and migration*

Systematic and comprehensive migration statistics exist in relatively few countries. A considerable number of countries maintain statistics confined either to particular categories of arrivals and departures or to particular points of entry into and departure from the country. There is a tendency for statistics on arrivals to be more complete than those on departures, and where it is intended to record all arrivals and departures, including temporary visits and so forth, a fictitious inward balance is sometimes obtained, though the majority of such movements ought to cancel out. Fortunately, the countries in which migration is apt to exert much effect on the population

trend are relatively few.¹ In some instances where census data and vital statistics are accurate enough, the difference between the amount of population change shown by two censuses and the excess of births over death recorded in the interval provides a fair estimate of the net balance of migration. This can be confirmed with the use of the census data on foreign nationals or foreign-born persons, or the migration statistics of the countries whence most of the immigrants come or where most of the emigrants go.

In countries where general inter-censal balances cannot be calculated, particular balances may help determine the degree of accuracy of birth and death statistics, such as deaths occurring at particular ages in relation to the apparent inter-censal survival at such ages, or births and estimated survivals from birth in relation to numbers of children enumerated at particular ages. These balances may throw light either on the accuracy of vital statistics or on that of census data on age composition and, depending on the circumstances, are more or less conclusive.

In a number of countries, independent checks have been carried out to verify the degree of coverage in the registration of births and deaths. The practice has not become sufficiently widespread to permit judgement on the accuracy of registration in other countries even where procedures and conditions can be presumed similar.

Incomplete registration statistics may provide some information that is analytically useful. Where very unequal numbers of births of the two sexes are reported, incomplete birth registration in respect of at least one sex can be assumed. Data showing shifts in the age composition of reported deaths, though reporting be incomplete, provide evidence of changes in the level of mortality.

Vital statistics have also been obtained in sample surveys of households. Experience has shown that there is some risk of omission, and that the risk is greater with respect to deaths than births. The reliability of the results depends on the particular methods used and on detailed appraisal of their success. Where no detailed check has been made, doubts of the accuracy of the results cannot be easily resolved. Sample surveys of this type have often been limited to selected localities, leaving doubt as to their representativeness, though increasingly the samples are so designed as to represent conditions throughout a country.

(c) *Age composition and analytical estimates*

Accurate reckoning of age is not habitually practised in many parts of the world with the result that census data and vital statistics by age groups contain many flaws. Some distortion of age data is also due to omissions of enumeration or registration, e.g., the frequent census under-count of young children and deficient registration of infant deaths. There are methods for measuring degrees of accuracy in age data and for correcting the data to some extent.

Where age data are very unreliable or are presented in broad age groups only, or have not been obtained at all, analytic methods often permit the construction of an approximate estimate of age composition of the population.

¹ For a detailed study, see *Problems of Migration Statistics* (United Nations publications, Sales No.: 50.XIII.1).

In population projections, some of the errors of age mis-statement—e.g., in statistic on deaths by age—tend to compensate each other and therefore do not cause much error in future population estimates. Of greater importance is the correction, where necessary, in the number of reported children, since future survivors from those age groups are relatively numerous and an error can have a great effect on evaluations of future age composition, birth rates and death rates.

Data on age composition are of great importance where estimates of the levels of fertility and mortality depend on analytical methods. When the age data are subject to error but the exact extent of error cannot be determined, analytical methods must be applied in such ways that errors of estimate resulting from faulty age data tend to be minimized. In many instances, for example, it is preferable to estimate the birth rate by the "reverse-survival" method from the group of children aged 5-9 years, rather than those aged 0-4 years, since, as a general rule, the enumeration of older children is more reliable than that of infants and young children. While this is the recommended method, it has the disadvantage that the estimated birth rate then refers to a period 5 to 10 years prior to the date of the particular census or survey, while the birth rate in more recent years remains undetermined. On the other hand, the enumerated group of children 0-4 years old can then be corrected on the assumption that the birth rate has remained unchanged, which is plausible in regions where the evidence shows little change of fertility in preceding periods.

C. AVAILABLE POPULATION PROJECTIONS

The population estimates for individual countries up to the year 1980 shown in this report have been derived, so far as possible, from recent population projections calculated by the institutions and experts of the countries concerned, and also some calculated by regional bodies. Certain criteria have been applied in the selection of projections for this purpose, including the condition that the projection was calculated fairly recently, that it was calculated by age groups with the use of life tables, and that patently unreliable statistics were not used without evaluation and adjustment. Preference has been given to national projections already assembled in more or less comparable form by a regional agency. This concerns particularly the projections for fourteen countries of Europe published by the Organization for European Economic Co-operation,⁵ those for fifteen countries of Africa calculated under the auspices of the Ministry of Co-operation of France,⁶ those for twelve Latin American countries calculated by the Economic Commission for

Latin America and by various authors at the Regional Centre for Demographic Training and Research in Latin America (CELADE),⁷ and those for nine areas in the Caribbean region brought together at a conference held by the Caribbean Commission in 1957.⁸

Except where projections for different countries have been prepared under common auspices, problems of comparability arise in the use of available national projections. The projections often differ in the manner of presentation, in the dates and time periods for which they have been calculated, and in the choice of alternative assumptions where they have been calculated in several variants. For some countries, variant projections have been calculated with different assumptions as to migration, for others with different assumptions as to future mortality changes, and for still other countries, on the basis of several alternatives regarding the future trend of fertility. Variants have also been calculated in some countries by a combination of assumptions differing in two, or all three, of these respects.

In order to achieve the maximum comparability possible, the selection of projections for various countries was guided by certain criteria; even so, full comparability could not be achieved. Where, among two or several variants presented, an indication was given as to which variant was regarded by the authors as most likely, that one was selected. In the absence of such an indication, a variant was selected with results intermediate between the extremes of the variants presented. In a few instances, an average of two variants was substituted. In projections for a country having a large share in the total population of a region, the fertility assumption was sometimes modified to conform with general assumptions made in this report for the long-range regional projections. In a few instances where demographic conditions in two countries were sufficiently comparable, a projection for the less populous country was derived, age group by age group, from an available projection for the country with the larger population.

Another source of non-comparability of available projections is the varying assessment of probable future migration. In countries of emigration, the future migratory balances appear, on the whole, to be estimated less generously than they are in the projections for countries of immigration. While the particular choice of assumption made in each country may have much pertinence, nevertheless, in the world as a whole immigration in some areas would have to be balanced by emigration from others. It has been necessary for the purpose of this report to make adjustments to achieve such a balance.

⁵ Projection for Bolivia, Brazil, Chile, Colombia, Cuba, the Dominican Republic, Ecuador, Guatemala, Haiti, Mexico, Panama, and Uruguay, presented in the chapter on Latin America.

⁸ *The Demographic Problems of the Area served by the Caribbean Commission: Projections* (Caribbean Commission) (prepared for the Technical Conference on the Demographic Problems of the Area served by the Caribbean Commission, Port of Spain, Trinidad, 25 July-2 August 1957).

⁵ *Demographic Trends in Western Europe and the United States, 1956-1976* (Paris, Organization for European Economic Co-operation, 1961).

⁶ *Perspectives de population dans les pays africains et malgache d'expression française* (Paris, Service de coopération, Institut national de statistique et des études économiques, Gouvernement de la France, décembre 1963).

Chapter 9

THE METHODS OF PROJECTION

A. THE UNITED NATIONS METHODS FOR POPULATION PROJECTIONS

The standard procedure for population projections which can be either refined or simplified as circumstances dictate—is to calculate from an initial population classified by age, and using an appropriate life table, the number of survivors for each age group. Usually this is done for five-year age groups of each sex by time-intervals of five years; the survivors of each age group will be five years older at the end of each interval, while children born during the time-interval and surviving will then be 0-4 years old. The estimate of children to be born is ordinarily derived from an appropriate set of age-specific fertility rates applied to estimated numbers of women of corresponding ages in each future time period. Refinements of procedure often consist in the use of more elaborate techniques for the calculation of the number of births. A minimum requirement of the standard procedure is data on the sex-age composition of the population as of some recent date, sex-age specific frequencies of death, and age-specific frequencies of childbirth to women.

Methods have been devised by the United Nations Secretariat suitable for use where some of these statistics are not available.¹ One feature of these methods is the use of a model life table presenting a representative set of sex-age specific mortality rates for any given general mortality level. The model tables, one for each of a wide range of mortality levels, are identified by the corresponding expectation of life at birth (both sexes, in years), designated for brevity as e_0 .

In respect of both mortality and fertility, the substitution of a generalized model for an actual age pattern introduces some errors, but these errors would rarely affect population projections to any great extent. More refined methods are indicated when the relevant data are available. But even the simplified methods constitute an unwarranted refinement in some instances, as when, for example, lack of adequate data on population age composition make the basic estimates for the calculation a matter of conjecture.

It follows that for certain parts of the world the United Nations methods are either too crude or too refined for general application. However, in order to attain a certain degree of interregional comparability, they have been applied uniformly for every world region in most of the calculations made for this report.

¹ *Methods of Population Projections by Sex and Age, Manual III* (United Nations publication, Sales No.: 56.XIII.3).

The assumptions with respect to mortality are stated in terms of e_0 . It should be understood that they refer in each instance to mortality conditions such as those represented by a model life table with the stated level of e_0 for both sexes combined (actually, with few exceptions, the expectation of life of females exceeds that of males).

The assumptions in respect to fertility are stated in terms of the sex-age adjusted birth rate, or "s.a.a.b.r.", a quantity ordinarily of a magnitude not dissimilar from that of a crude birth rate in which a generalized age pattern of variations in fertility rates is implied.² It should be understood, however, that under the influence of varied and changing age composition of the populations, the s.a.a.b.r. can differ quite appreciably from the crude birth rate and care should therefore be taken to avoid confusion between the two measures. In applying the s.a.a.b.r., the numbers of either sex born have been calculated mostly on the assumption that 105 boys are born for every 100 girls.

B. ESTIMATES FOR INDIVIDUAL COUNTRIES, 1960-1980

The available national population projections have been calculated in many instances on the basis of data prior to 1960 or prior to the most recent census. They differ, therefore, in many instances from the most recent (sometimes revised) official estimates for mid-year 1960. In all these instances, all figures of the projection were pro-rated so as to coincide with the latest official estimate for 1960 (1962 for countries of Europe). The available projections for some countries were not calculated for mid-year dates; where the dates of the calculation differed from the mid-year dates 1960, 1965, and so forth, by less than one year, all results of the projection were likewise pro-rated so as to obtain figures for the required dates. Some of the available projections were calculated for dates such as 1957, 1962, and so forth, or 1958, 1963, and so forth; these were interpolated so as to obtain the corresponding

² The s.a.a.b.r. is calculated as 1,000 times the number of births divided by the sum of numbers of women aged 15-19 years, seven times those aged 20-24 and 25-29, six times those aged 30-34, four times those 35-39, and the number aged 40-44. In theory, it can be identified as a fixed multiple of that gross reproduction rate which would have to apply to result in the given number of births if age-specific fertility rates, for age groups 15-19 to 40-44 were in the assumed ratio 1:7:7:6:4:1. For practical purposes, these weights have been selected to represent a wide average of actual observations; they offer ease in calculation and attain, under most conditions exhibiting no major irregularity, a value near that of the crude birth rate. (*Population Bulletin of the United Nations*, No.7) (Sales No.: 64.XIII.2). Actually, the recent United Nations study on levels and trends of fertility has shown that age patterns of fertility vary rather widely.

mid-year estimates for 1960 and subsequent dates at five-year intervals.

Not all the available projections extended as far into the future as 1980. Where they did not, appropriate extrapolations were applied.

Suitable projections were available for the majority of countries in several regions, for a number of countries in other regions, and for few or no countries in still other regions. Where the population concerned was fairly large and no projection was available, a projection was sometimes calculated in conformity with general assumptions of this report, while in other instances, population estimates were derived from the regional "medium" projection of this report and from past observations of differences in rates of growth between the particular country and the average for the region. For a few countries, population projections calculated by the United Nations on an earlier occasion were used.

In some instances, where a suitable population projection was available for a large country of the region, this projection was also used as the basis for the "medium" variant for the regional long-range projection, with such extensions of the assumptions implied in the original projection as appeared appropriate. In some other instances, the fertility assumption of an original projection for a given country was modified to conform with "medium" assumptions made for the region.

In the chapters dealing with each region, the sums of country projections are compared with the results of the "medium" projection for the region up to the year 1980. In most instances, the discrepancies are small.

C. GENERALIZED ASSUMPTIONS FOR THE "HIGH", "LOW" AND "MEDIUM" VARIANTS

(a) *Mortality*

The generalized form of the mortality assumption in all variants is half a year's gain in expectation of life at birth (both sexes) with the passing of each year, but with different and eventually diminishing rates of gain at the high levels of life expectancy and no further gain past an expectation of 73.9 years. This assumption was applied in making projections for each region as a whole; it does not exclude the possibility that in some countries the life expectancy might rise above the assumed limit of 73.9 years.

Regions in fact differ in the rate of progress achieved in recent years, and in the obstacles which may impede further progress. For instance, where well-organized public health services have resulted in a considerable rise of life expectancy despite limited financial resources, the increasing costliness of further achievement may cause slower progress in the future. Similarly, where there are now major obstacles in transport and communication, progress for a time may be slow but it may accelerate later if these impediments are reduced. These and other considerations have been borne in mind and the generalized assumption modified where circumstances indicated a change to be appropriate.

In most regions of the world, barring catastrophies which are not considered in this report, the amount of

plausible variation in future death rates appears decidedly smaller than that of future birth rates. The causes of mortality change and corresponding expectations are also much better known. Accordingly, it was considered sufficient in these regions to base the projections on one mortality assumption only, as seemed appropriate to each region.

(b) *Fertility*

An important distinction must be made between regions of high and low fertility (gross reproduction rates greater or smaller than 2.0), though there is much diversity among regions within both groups, as noted in chapter 1. Assumptions for the future had to be formulated in different ways for the two groups.

Among the regions of high fertility, further distinctions had to be made. In regions with hitherto largely tribal organization and little urbanization, for instance, though foreseeable social changes may affect fertility in different ways, it may remain high until the end of the century. Elsewhere, processes making for an eventual change in attitudes as regards the number of children to be born have already been operating for some time, and in those regions the main questions are how soon a decisive decline of fertility will begin and how long and how far it will continue.

The regions of currently high fertility in which the possibility of at least the onset of a large decline within the period from 1960 to 2000 has to be foreseen, comprise a majority of the world's population. But there is little basis for formulating the appropriate assumptions in the detail required for specific calculations. The fertility declines which have taken place in areas of presently low fertility have occurred at different times and different speeds, and even if that experience is summarized by some kind of an average, it is uncertain whether the result is very pertinent to expectations for the regions of presently high fertility. Obviously, the assumptions can only be speculative. The generalized pattern for these assumptions (from which a number of departures had to be made) has been arrived at as follows:

(i) *Amount of decline.* In many of the countries and regions where fertility is now low, it was formerly about twice as high as at present. Thus, fertility in the Soviet Union and Northern America was once very high and is now moderately low; in Western Europe and Japan, fertility was at one time moderately high and is now very low. In all these instances, the fertility level is near one-half that which prevailed before fertility underwent its decline.

(ii) *Duration of decline.* While such assumptions are inevitably schematic, it was necessary to adopt a model assumption for the length of time between the beginning of a decisive decline and attainment of one-half of the initial level. The experience of countries in which a decisive fertility decline has occurred offers little guidance, since special circumstances can be cited to account for the slow decline in some and more rapid decline in others. On the whole, a thirty-year period is fairly representative and this has been taken as the general standard for the present projections. It corresponds to the time required

to replace one parental generation completely by a new generation in the reproductive ages.

(iii) *Pattern of decline* Since such a decline is unlikely to begin or end abruptly, it is reasonable to assume that its onset will be slow, that it will gather speed later, and that eventually the decline will slow down before it reaches its lower limit. Actually, wherever it occurred, the decrease in family size generally began in socio-economic groups which constituted a minority of the population and spread with varying time-lags to other groups. Whenever this pattern is repeated, a gradual acceleration and an eventual slow-down is a plausible expectation. Accordingly, the assumption has been formulated as follows: *the s.a.a.b.r. in successive five-year periods following onset of the decline is to average 97.5, 90, 80, 70, 60, and 52.5 per cent of its initial value and to settle thereafter at the level of 50 per cent.*

(iv) *Date of onset.* It is evident that when the assumption is cast in these terms, the results of the population projection will depend largely on the assumed date of onset of such a fertility decline. *In this respect, alternative assumptions were made in the case of each region, and the alternative dates were set wider apart in some regions than in others.* A "high" assumption, in this instance, is an assumed late date of onset and a "low" assumption is an early date of onset. The decline of fertility as interpreted here is a concomitant of improving economic and social conditions and increasing knowledge of, and means and motivation for, the limitation of births.

Other factors being equal, there is reason for supposing that economic and social improvement may have rather little effect on fertility until a certain critical level or "threshold" of development is reached, but this critical level is largely undetermined.³ Dissemination of knowledge and means of limiting births may be either promoted or retarded as a matter of public policy, but there is not much basis in experience up to the present time for predicting the effects of such policy measures in various economic and social circumstances.

The fertility assumptions for a majority of the world's population are of this type. It must be emphasized that precisely this form of decline cannot be expected in any given instance since great changes of this kind rarely follow a smooth trend. Furthermore, a number of modifications had to be made. Among the considerations involved in the choice of assumptions for each region are existing public policies, evidences of economic and social changes such as have been associated elsewhere with impending fertility decline, and geographic proximity or cultural affinity with population groups where a substantial fertility decline has occurred or appears likely to occur soon.

In regions where geographic distance or ethnic diversity may act as impediments to the diffusion of new patterns of living, the average level of fertility is apt to decline more slowly on that account. As explained in the respective chapters, the assumed duration of decline is extended to 45 or 60 years in some instances. Again, where decline already seems to be in progress (e.g. China (Taiwan)), the

assumptions are varied in respect of the fertility level that will eventually result when the decline has run its full course. As mentioned already, the possibility of no decline beginning before the year 2000 has, in some instances, been retained at least as a "high" assumption. In regions of tropical Africa, where substantial fertility decline before the end of the century does not seem a plausible assumption, it has been assumed that fertility will remain high but variable; some rises or drops from current levels up to 1980, and constant levels thereafter, have been conjectured for the "high", "low" and "medium" variants of the projections.

Turning now to the regions of low fertility, the distinction between those of very low and moderately low fertility will be recalled. Gross reproduction rates range generally from 1.0 to 1.3 in Europe and in Japan, and from 1.4 to 1.9 in the Soviet Union, Northern America, Australia and New Zealand. The recent levels have proved to be rather variable and the variations appear to have been wider in the regions of moderately low fertility than in those of very low fertility. Accordingly, "high" and "low" assumptions have been made to encompass the possibility of future variations within the range of variation already observed. The "medium" assumption, often falling near the middle of this range, has generally been formulated with reference to assumptions made in the available national population projections.

As a "high" assumption, the sex-age adjusted birth rate is assumed to average 20 per 1,000 from 1970 onward in regions of very low fertility, and 25 per 1,000 in regions of moderately low fertility. As a "low" assumption, it is assumed to fall to 16 per 1,000 in 1970 (or somewhat later) in regions of very low fertility, and to 18 per 1,000 in 1970 (or somewhat earlier) in regions of moderately low fertility. Within this framework of assumptions for low-fertility regions, modified assumptions have been made in some instances.

It is not certain that the fertility assumptions adopted are equally apt to represent prospects in all regions of the world. As time passes and experience accumulates, the basis for judgement may be improved. At present, conjectures are very uncertain. It must be emphasized especially that the assumptions made for high-fertility regions have only a tenuous basis in known facts.

(c) *International migration*

For reasons mentioned in chapter 1, international migration is unlikely to regain the importance it once had in the settlement of thinly inhabited or empty lands; nevertheless, it remains an important factor in some areas where either the rate of natural increase is very low or the rate of net migration is comparatively high. In countries where migration is a significant element, the population projections made locally usually take expected future migration into account, but as already noted, the migration assumptions are often not comparable internationally. For national purposes, it is common to assume some measure of improvement in economic conditions in estimating future population. This implies that in countries which have had much emigration, the rate of emigration may diminish though, by the same token, a

³ See chap. IX in *Population Bulletin of the United Nations*, No. 7 (Sales No.: 64.XIII.2), pp. 134-151.

large number of immigrants would continue to be expected in the countries of immigration. It was therefore considered necessary, for the purpose of the present projections, to limit migration assumptions to those regions where the recent volume of net migration has been relatively large in proportion to the natural population increase; to formulate these assumptions in a simplified model; and to modify the assumptions made in national population projections so as to assure that the assumed outward migratory balances for some areas would equal the corresponding inward balances for others.

Migration assumptions were introduced into the calculation of "high", "low" and "medium" variants of the regional population projections in Europe, the Americas, and Oceania. It is by no means certain that these will be the only areas with significant migratory balances between now and the end of the century, but migratory balances of a significant magnitude in relation to population growth are not now foreseeable for any other large regions.

The difficulty of reconciling projections of outward and inward migratory balances for various countries was overcome by substitution of an intermediate assumption. To arrive at this it was considered, first, that Latin America as a whole might experience as much immigration (notably to Argentina) as emigration (notably from the Caribbean and from Mexico), leaving perhaps an insignificant net balance. The problem was thus reduced mostly to a comparison between net emigration expected from Europe and net immigration expected in the United States, Canada, Australia, and New Zealand. The national population projections available for European countries suggest a net outward balance from Europe of about 115,000 migrants annually, while the combined projections for the four major immigration countries anticipate a net immigration of 460,000. Should economic development progress at a comparable rate in all these areas—and European migration to Latin America approximately equal Latin American migration to Northern America—the net result might well be an intermediate volume of net migration. For the present purpose, therefore, it was assumed that in the period from 1960 to 1980 the annual migratory loss of Europe would mount to 230,000 individuals, i.e., twice the number assumed in the European national projections and one-half the number implied in national projections for the United States, Canada, Australia and New Zealand. The assumption comprises a net immigration (presumably most from Europe) of 40,000 annually to Temperate South America, and an equally large net emigration (presumably mostly to the United States) from the Caribbean and the Middle American mainland. Where the results of national population projections are presented country by country, the national migration assumptions are retained, but in the regional summaries, the modified assumptions are made as stated above.

For the 1980-2000 period, it was assumed that the migratory balances would diminish linearly so that they would vanish by the end of the period. This assumption was made because migration does not have the stability of the other components of population change, and also because the importance of migration has been diminishing in the long run. It is quite possible, of course, that new migratory currents will spring up in the future, but such speculations are not relevant to the present purpose.

The adjustments in respect of migration were calculated with a rough and greatly simplified model. In that model, it was assumed that an annual migratory balance of 1,000 individuals would entail, within a ten-year period, a demographic gain (or loss) of 12,000 individuals and that the effect would be an addition to (or subtraction from) the population amounting to 15,000, 18,000 and 20,000, respectively, by the end of each of three subsequent ten-year periods.¹

D. THE COMBINATION OF ASSUMPTIONS FOR "HIGH", "LOW", AND "MEDIUM" VARIANTS IN PROJECTED POPULATION TRENDS

The manner of combining alternative assumptions relating to fertility and mortality trends is now considered.

As long as fertility and mortality can move independently, a "high" variant of population growth results from the combination of a "high" alternative for the birth-rate trend with a "high" alternative for the trend in expectation of life. Similarly, the "low" population variant would combine the "low" alternatives for assumptions regarding both *s.a.a.b.r.* and e_{10} . Assumptions have in fact been combined in this way in carrying out the projections for some regions. In other cases, however, it has been considered appropriate to make different combinations, allowing for the possibility of some degree of interdependence between the future trends of fertility and mortality.

One possible reason for such interdependence might be that the magnitude of population or the rate of its growth might be restricted in some regions by limitations of possibilities of economic development. Thus, a "high" future trend of fertility might be compensated by lower values of expectation of life than would be attainable if fertility were to be lower. This view is debatable as regards the nature and degree of determinism implied; and at any rate, for the reasons stated previously, it was not considered appropriate for the present purpose to construct projections corresponding to pessimistic assumptions as to the possibilities of economic development. However, there are also other considerations which make it appear plausible that the future trends of fertility and mortality in certain regions of the world might not be entirely independent of each other.

First, it appears possible that great improvements in health conditions in developing countries may be conducive in some cases to a moderate rise in fertility even though fertility is already high. Since the areas where this seems most plausible are, in general, also the ones for which statistical documentation is incomplete and uncertain, it was found opportune in these instances to combine a "high" fertility assumption with a "low" mortality assumption for the "high" projection variant, and to do the opposite for the "low" variant. This appraisal of demographic prospects, however, seems pertinent only to certain less developed areas.

¹ International migrants, being predominantly young adults, bring about a larger demographic gain (or loss) in the course of time than is indicated by the net balance of movements across the national boundary. Rough orders of magnitude were believed to suffice for the present purpose. The model was applied cumulatively where migration was assumed to continue during successive ten-year periods, and with varying amounts where the migratory balance was assumed to diminish.

Second, in most areas where present levels of mortality and fertility are relatively high, the prospects for both falling mortality and falling fertility in the future appear to depend at least partly on the success achieved in economic and social development. Rapid development would tend both to promote the rise of expectation of life and to enhance the likelihood of fertility entering an early decline, although the presumed association in this case is also debatable.

Third, a connexion between the trends of fertility and mortality in such areas may also be considered likely because reduction of infant and childhood mortality rates may weaken motivation for procreation of a large number of offspring. Again, the hypothesis is debatable and even if it is granted as valid, a question remains as to how much time might elapse before the experience of reduced mortality rates would induce parents to limit births. Nevertheless, consideration of this view adds to the plausibility of combinations of assumptions in which "low" mortality is associated with "low" future fertility trends.

The strength of such associations between future levels and trends of mortality and fertility may vary from one

area to another and may change in the course of time. Hence, different weight has been given to the possibility of such associations in constructing projections for different regions of the world.

In most regions where a possible future change in fertility would affect population growth more than any probable variation of the mortality trend, it was considered sufficient to calculate variant projections in terms of varied fertility assumptions only. For in many such regions, it is not likely that fertility will be high in the event of a very great reduction in mortality, nor that it will be low in the event of only a slight mortality reduction. An intermediate mortality trend, judged to be plausible, was therefore combined with "high" and "low" as well as "medium" evaluations of future fertility trends.

In other regions, where less change in fertility can be plausibly anticipated in the next few decades, alternative future courses of mortality are the more important factors to be considered. These include regions where there is much uncertainty as to the speed with which mortality is likely to decrease in the future, or where statistical documentation is inadequate.

Part IV
BASIS AND RESULTS OF ESTIMATES FOR REGIONS
AND COUNTRIES

Chapter 10 EAST ASIA

A. MAINLAND CHINA

The weakness of data on fertility, mortality, and population growth in mainland China requires special emphasis. A consistent and reliable series of the population trend over a period of recent years does not exist. The estimates adopted here are consistent with the apparent trend over a long period in the past (which is also very unreliably documented) and with the officially published total of the 1953 enumeration, but they do not agree in all cases with official estimates of the population in years since 1953. The estimate of the recent rate of growth has been derived mainly from an estimate of the fertility level obtained from an analysis of data on age composition of the population together with conjectures based on analogy as to the mortality level and its recent changes. In this manner, rough population estimates for 1950 and 1960 have been obtained and, in view of the uncertainties, expressed in greatly rounded figures. It cannot be claimed that the estimates of this report are more accurate than other population figures for the Chinese mainland published elsewhere, but they are preferred in the present context because similar methods, particularly the estimation of the birth rate from data on age structure, have been employed here also with respect to other countries where adequate statistics are lacking.

1. Population growth, 1920-1960

(a) The population trend up to 1953

Four types of data represent China's population and its changes over the past two centuries: statistics derived from the ancient system of continuous local registers (*pao-chia* records); results of incomplete censuses taken between 1909 and 1947; data from local surveys; and the results of the census of 1953.

National population totals ostensibly based on the *pao-chia* system of local records were compiled annually during more than a century of the last Imperial Dynasty's rule. These statistics are not precise and they often indicated highly implausible changes from year to year. Some experts consider them to have little value, while others believe that they may represent by rough approximation the long-range trend of population. The statistics suggest fairly rapid population growth during the eighteenth century, followed by slower growth in the first half of the nineteenth. In 1851, the last year in which totals for the whole country were recorded, 432 million inhabitants were reported (including the population of China (Taiwan)). There are well-documented reasons to

doubt the reliability of this figure as an even approximate measure of China's population in 1851.

Rebellion and disintegration of central administration prevented further national compilations during the remainder of the Imperial period, though *pao-chia* records were still maintained in many localities. A modern population census was attempted during 1909-1911, but was not complete when the Imperial rule ended. The Government of the Republic of China repeated the attempt in 1912 and again in 1928-1929 but failed to enlist all the needed support at every local and regional level. Efforts were made to evaluate the defective results but the magnitudes of errors of various types could not be accurately assessed and reliable population estimates could not be reconstructed. Censal counts were again attempted in numerous districts (*hsien*) in 1942 and in a number of provinces in 1947, but that was a time when fear of military recruitment may have partly falsified the enumeration. During 1940-1948, *pao-chia* registration data were compiled again but some regional data were lacking or replaced by rough estimates while the basis of some others remained unverified. The totals then fluctuated between 450 and 465 million but were known to be deficient and the extent of deficiency could not be ascertained.

Numerous attempts were made during the period from 1910 to 1947 to arrive at unbiased estimates of the country's total population and its changes of population since 1851. Estimates for the years around 1900 which were obtained by trying to fill gaps in provincial *pao-chia* reports in order to arrive at national totals were mostly in the vicinity of 400 million or somewhat higher; Chen Chang-heng, for instance, presents official figures of 430 million for 1890 and 440 million for 1900 (including China (Taiwan)).¹ Various estimates in the neighbourhood of 400 million were derived from the incomplete census results of 1912. Estimates based on the 1928-1929 census results varied widely; for example, Warren H. Chen estimated 445 million, Chen Chang-heng 462 million, Liu Nan-ming 475 million,² the Chinese Post Office 486 million, and the Shanghai Geographic Society 502 million. None of the estimates had a firm basis and it is possible that all were too low.

War, epidemics and famine visited the country frequently, causing large excesses of mortality in particular years and particular regions. Large population losses may

¹ Chen Chang-heng, "Some Phases of China's Population Problems", *Bulletin de l'Institut International de Statistique*, vol. XXV, livr. 2, 1931, pp. 18-54.

² John D. Durand, "The Population Statistics of China, A.D. 2-1953", *Population Studies*, vol. XIII, No. 3, (March 1960), p. 247.

have resulted from the Tai-Ping Rebellion which broke out in 1851 and from the disorders of the following decades. The frequency and severity of unmitigated disaster are thought to have been greatest in the second half of the nineteenth century though calamities of severe consequences continued throughout the first half of the present century. In recent decades, modern life-saving techniques gained a foothold at least in limited areas and the means of relieving disaster were extended somewhat by limited improvements in transportation and the distribution of essential supplies. However, the effectiveness of relief efforts continued to be handicapped by the relatively few and often disrupted modern means of internal transport and communications.

These considerations make it appear plausible that population was not much larger in 1900, possibly even smaller, than it had been in 1850, and that the long-range trend probably turned upward during the first half of the present century. Such a conjecture is consistent with the dubious population estimates cited above and with the opinions of several historians who have examined the evidence as to economic and other pertinent conditions. Together with the recorded total of 432 million for 1851 (which, it should be repeated, deserves little confidence) and the 1953 census total of 583 million, the above conjecture as to the form of the long-range trend would imply that the increase of the population during the first half of the twentieth century was around 150 million, or roughly one-half of 1 per 100 per annum as an average for this period. Flimsy as this estimate is, no better estimate appears to be possible in the present circumstances. It was taken as the basis for constructing a tentative series of population figures for China, as required to fill out the picture of population in the world and its various regions since 1920.

In comparatively undisturbed years, China's population no doubt increased faster than the long-term average rate, but not a decade passed until mid-century without severe troubles which must have caused temporary setbacks. The losses caused by these disasters could not be calculated and it was assumed, for simplicity, that the population increased by 5 to 6 per 100 in each decade from 1920 to 1950, though perhaps at a higher rate in the short period from 1950 to 1953. Rounded population totals were selected which agree approximately with this assumption. The results, shown below, are likely to err considerably but for the lack of better ones they were included in the world population totals of the present report.³

| Year | Approximate population (millions) |
|----------------|-----------------------------------|
| 1920 | 475 |
| 1930 | 500 |
| 1940 | 530 |
| 1950 | 560 |
| 1953 | 583 |

³ Somewhat lower estimates of mainland China's population in 1920, 1930, and 1940 were used in drawing up the series of world and regional population estimates for those dates shown in table 2 of issues of the United Nations *Demographic Yearbook* up to 1963. In spite of the uncertainty in any series of estimates for this country, the present series is thought to be preferable to the one used previously. Slight differences between these figures and the series shown in *The Population of Asia and the Far East, 1950-1980* (United Nations publication, Sales No.: 59.XIII.3), p. 24, are partly due to rounding of the figures.

The plausibility of these figures can be examined. If it is assumed that the crude birth rate averaged about 37-40 per 1,000 (as discussed further on), such estimates imply an average crude death rate of about 30-35 per 1,000 for the period 1920-1950. In a population of corresponding age composition, such a death rate could be consistent with an average expectation of life at birth of 28-33 years. This is approximately the range of estimated values for India in the decades 1900-1950. Expectation of life may have been lower in the earlier disaster-ridden decades, but as an average for all decades since the beginning of this century, an expectation of 28-33 years seems plausible. It refers to a long period and if different conditions are assumed from about 1950 onward, the implication is not necessarily an abrupt change.

(b) *Fertility*

Efforts were made during 1951-1955 to develop a national system of vital statistics and official estimates of the birth and death rates in mainland China were published for the years 1952 to 1957, based on results of surveys and reports for areas where the registration was considered satisfactory. The estimates of the birth rate are as follows:

| Year | Death rate (per 1,000 population) |
|----------------|-----------------------------------|
| 1952 | 37 |
| 1953 | 37 |
| 1954 | 38 |
| 1955 | 35 |
| 1956 | 32 |
| 1957 | 34 |

The estimate for 1952 was stated to have been based on the results of sample investigations in twenty-six representative cities and six representative *hsien*. A sample of over 30 million persons was reported to be the basis for the 1953 estimate. It is not possible, however, to evaluate these estimates for lack of adequate information on the areas represented, on methods of investigation, and on details of the data obtained. A cause for doubt about the accuracy of the figures is the appearance of discrepancies between the population increases implied by the birth and death rate estimates and the annual series of population estimates published up to 1957.⁴

Local demographic investigations were undertaken also during the 1930's and 1940's in various parts of mainland China, in which information on births and deaths was recorded.⁵ In general, a sufficient basis for evaluating the accuracy of these data is lacking. Furthermore, there is no satisfactory basis for weighting the estimates for different areas and dates so as to derive a reliable estimate of the vital rates for all China at any date.

There are also some data on age composition of the population in various parts of China, obtained in surveys

⁴ John S. Aird, "The Present and Prospective Population of Mainland China", *Population Trends in Eastern Europe, the USSR and Mainland China* (New York, Milbank Memorial Fund, 1960), p. 122.

⁵ Some of the results of these investigations are discussed in the United Nations publication, *The Population of Asia and the Far East, 1950-1980*, op. cit., pp. 81-83.

and regional censuses carried out during the 1920's, 1930's and 1940's, which provide an alternative and possibly superior basis for birth rate estimates, though such data also have their drawbacks. If the numbers of people in various age groups were accurately recorded and adequate information on mortality were available, the level of the birth rate and even its changes over a period of time could be estimated with considerable assurance. In actual fact, distortions are apparent in the age data, reflecting in a varying degree some typical effects of age mis-statements and faulty enumeration, which may cause considerable errors in birth rate estimates derived from them. Lack of knowledge of mortality is a source of further errors, although a large error in the assumed death rate causes a much smaller error in the birth rate calculated by this method.

Numerous analyses of data on age composition have been made with this objective, including a study by the United Nations Secretariat.⁶ In a recent study, these same data and some others (from extensive surveys of farm households conducted in China in 1929-1933 and from the provincial enumerations of 1942 and 1947) have been re-examined in an effort to evaluate their sources of inaccuracy and consequent errors in birth rate estimates.⁷ In particular, it was found that the prevailing distortions in the age data for males and females differed substantially and different estimates of the birth rate were obtained from the age data for the two sexes. This finding led to a recalculation of previous United Nations estimates; this time, they were calculated separately from age data for each sex, assuming an expectation of life at birth of thirty years.⁸ The results are briefly summarized below.

Birth rates calculated from 1929-1933 survey data for males by age groups, for eight large regions, ranged from 36 to 45, with 40 per 1,000 as an average; corresponding rates estimated from the 1942-1947 census data for nine provinces ranged from 36 to 44, with 41 per 1,000 as the average.

Calculated from the data for females, birth rates based on the first set of data ranged from 29 to 41, averaging 38 per 1,000; and the second set of data yielded birth rates between 36 and 39, with 37 per 1,000 as the average.

Depending on whether the data for one sex or the other are considered more reliable, a first estimate of the

national average birth rate in the 1930's and 1940's can be put either at 40-41 or at 37-38 per 1,000. Both the 1929-1933 and 1942-1947 data, in the ratios of numbers of either sex at each given age, suggest incomplete counts of females, both children and adults. Both sets of data, and especially the 1942-1947 set, show a systematic deficit in the enumeration of young adults, especially males at ages where they might be migrant labourers or liable to military recruitment. Judged in this way, the data for females may have partly compensating errors, and although the birth rate estimates derived from them may be too low, they are not necessarily so. The kinds of errors suspected in the data for males, on the other hand, are such as to give exaggerated estimates of the birth rate. The birth rate estimates are comparatively low for those provinces where the age data show least evidence of distortion.

With an element of judgement, the average birth rate in the areas surveyed in past decades seems more likely than not to have been between 37 and 40 per 1,000, though the possibility that it fell outside these limits is far from being excluded. The matter does not rest here, as there may be other sources of systematic error than those considered above. The major sources of error, however, may partly compensate each other, as is argued below.

First, the foregoing calculation is based on an assumed expectation of life of thirty years. Even if this assumption is appropriate to mainland China as a whole, on the average of several decades, it may not be representative of the areas which were more accessible to surveys, or of the time when the surveys were undertaken. If, in the areas surveyed, expectation of life averaged forty years—admittedly a rather high estimate—the birth rates have been calculated about two points too high.

Secondly, the areas surveyed under-represent parts of the country where other information suggests that the birth rate was above the national average, especially in North-East China and Szechwan Province. With a correction on this account, the average birth rate of the entire mainland might be calculated about one point higher than the average for the surveyed areas.

Finally, as the method depends on model life tables, the estimate of the birth rate may err on account of infant mortality being related to the general mortality level in China in a manner unlike the models which correspond to average conditions elsewhere in the world.⁹ However, as the same model life tables were also used in calculating the population projections, the effect of such an error in the birth rate upon estimates of population growth would be at least partly cancelled by the corresponding error in infant mortality.

The range of 37-40 per 1,000 was therefore accepted as an estimate of the average level of the birth rate in mainland China during the 1930's and 1940's so far as it could be deduced from the data on age composition of the population, although the possibility of a higher or lower average cannot be denied. This estimate is con-

⁶ *Ibid.*, p. 84.

⁷ I. B. Taeuber, "The Conundrum of the Chinese Birth Rate", *International Population Conference, Ottawa, August 21-26, 1963* (Liège, 1964), pp. 221-240 (compiled by the International Union for the Scientific Study of Population and published with the financial assistance of UNESCO). The object of that study was to examine the data, and not to estimate the birth rates. No specific assumption with respect to mortality was made. Calculations were carried out by assuming either a stationary population or one increasing at a given rate, leading to diverse estimates of the corresponding birth rates. A much narrower range of birth rate estimates results when a given uniform level of mortality, rather than a uniform rate of increase, is assumed, as has been done in United Nations calculations. Admittedly, uniformity in either the mortality level or the rate of population increase in different parts of China is scarcely a plausible assumption.

⁸ Errors possibly resulting from this assumption with respect to mortality are examined further on. Actually, mortality almost certainly varied from place to place and in the course of time but, as there is no evident reason to assume an inherent correlation between fertility and mortality among various areas in China, the range of birth rate estimates so obtained need not differ substantially from the range of birth rates which actually prevailed.

⁹ Not much is known of the relation between infant mortality and general mortality in China. In various parts of the world, infant mortality is found to be considerably higher or lower than might be expected, under average conditions, in relation to the general mortality level.

sistent with the officially estimated birth rates of 37-38 per 1,000 for the years 1952-1954, and although the agreement might be fortuitous, it lends strength to a tentative conclusion that the Chinese birth rate in recent decades has, more likely than not, averaged in the range of 37-40. A corresponding estimate of the gross reproduction rate is in the range of about 2.25 to 2.50. This would mean that China is a country of "moderately high" fertility, i.e., lower fertility than that of the majority of developing countries in Asia, Africa and Latin America, and at about the same level as seems to have prevailed in much of Europe during the eighteenth and nineteenth centuries.

In accordance with the practice followed generally in making the calculations for the present projections, where exact information was lacking, a rounded figure was substituted. In this instance, 38.0 per 1,000 was taken as an estimate of the average crude birth rate on the Chinese mainland during decades preceding 1950, although it is not pretended that the estimate has such a degree of precision. In conjunction with a high average level of mortality (*viz.*, the estimate of thirty years as the average expectation of life at birth), such a crude birth rate would correspond to a sex-age adjusted birth rate of 37.91 per 1,000, which was used in the calculations for the present purposes.

With regard to the trend of the birth rate since 1950, several different possibilities were considered. As already mentioned, the officially estimated birth rates for 1952-1954 were at about the same level as those estimated for decades prior to 1950, but a lower level was indicated by the official estimates for 1955-1957.

Some decrease in the crude birth rate would have resulted even with unchanged fertility in view of the estimated sharp decrease in mortality. There would then have been a disproportionate increase in numbers of surviving children and, until these children reached adulthood, the size of the total population would have grown proportionately more than the population in reproductive ages. The crude birth rate calculated on the basis of total population would then have been somewhat lower, even if no change had occurred in the age-specific rates of child-bearing. But the drop in the officially estimated rates after 1954 was large and if it was not due to errors in the estimates, it might be interpreted as a response to changing social conditions, like the declining trend of birth rates noted recently in Singapore and China (Taiwan). The policy of the Government of China (mainland) is another factor which might help to account for such a trend. An intensive campaign of propaganda was carried out from 1956 to 1958, urging postponement of marriage and restriction of births, and steps were taken during this period to provide contraceptive information and materials to persons desiring them. Between 1958 and 1961, this campaign was abated, but it has been renewed since 1962 with the press and public officials stressing that limitation of births would be helpful in safeguarding the health of mothers and children and enhancing individual opportunities for education and economic activity.

On the other hand, the official population estimates for years since 1953 imply a high and rising rate of population growth up to 1957, which would mean either a higher

birth rate than officially estimated or a sharper decrease of the death rate than seems plausible. Thus, it is possible that the entire series of data on the birth rate from 1952 to 1957, fell short of actual levels. Higher fertility in the 1950's than in preceding periods might be explained on the assumption that the fertility level of earlier decades was depressed owing to warfare, internal strife and other calamities, and to poor conditions of health impairing the reproductive capacity of the population. In those circumstances, the establishment of a strong new government and the cessation of strife, together with improvements in economic, employment and health conditions might well have led to some increase in the birth rate.

In view of the conflicting indications and the lack of reliable data, three alternative assumptions were retained for the purpose of the calculations, with regard to the fertility trend in mainland China since 1950: (a) that fertility remained constant at the same level estimated for previous decades; (b) that it rose considerably during 1950-1955 and remained at a higher level thereafter; or (c) that it remained constant until 1955 and then entered a decline.

(c) Mortality

The official estimates of death rates in mainland China for the years 1952 to 1957 were as follows:

| Year | Birth rate (per 1,000 population) |
|----------------|--------------------------------------|
| 1952 | 18 |
| 1953 | 17 |
| 1954 | 13 |
| 1955 | 12.4 |
| 1956 | 11.4 |
| 1957 | 11 |

What was said above about the problem of evaluating the official estimates of the birth rate during these years applies with greater force to the death rate estimates. It is not possible to evaluate them without detailed information on the geographic scope, methods and results of the investigations on which they were based, and their validity is put in question by inconsistencies between the birth and death rate estimates on the one hand and the official series of annual population estimates on the other. To the extent that the data were derived from household inquiries, there is more reason for questioning the accuracy of the data on deaths than of those on births. Experience with such inquiries in other countries as a means of obtaining death rate estimates has been rather discouraging on the whole; in general, it seems that the risk of omissions in reporting is greater in the case of deaths than of births.

There is no satisfactory basis for independent estimates of the death rate in mainland China, such as the birth rate estimates derived from data on age composition of the population. Mortality rates cannot be calculated within tolerable margins of error from such age statistics, unless there are comparable data on population by age groups in the same area at two or more dates. Only rough conjectures as to the past level and trend of the death rate in mainland China are possible, such as those offered in

subsection (a) above. The consideration stated there made it seem plausible that the long run average of the death rate in the first half of the present century might have been in the range of 30-35 per 1,000, though it could have been higher or lower. As already stated, this range of death rates corresponds to an expectation of life at birth in the range of 28-33 years or, as a round figure, about thirty years. For lack of better information, this round figure was taken as representative of mortality conditions in China during the decades prior to 1950. The corresponding figure for the crude death rate is 33.2 per 1,000, though it must be understood that such precision in an estimate for mainland China is entirely fictitious.

After 1950, considerable improvements in conditions of health and survival were achieved in mainland China, as in other developing countries. The Government promoted public health measures especially in the fields of environmental sanitation and control of infectious diseases. Medical and paramedical staff, hospitals, clinics, ambulances and the manufacture of drugs were increased and progressive measures of environmental sanitation were instituted with the assistance of local action committees. As experience elsewhere in the world has shown, mortality could decrease rapidly under such conditions. The cessation of internal warfare and unification of the country under a strong central government enhanced the potential effectiveness of such health programmes, as well as the effectiveness of measures to avoid or mitigate losses of life resulting from natural calamities and local crop failures. But while it can scarcely be doubted that the death rate was reduced in the early 1950's, there is no available measure of the extent of the reduction or the level achieved other than the dubious official series of estimated death rates quoted above.

The trend in more recent years is still more uncertain. It is possible that priorities in public-health work could not be maintained around 1958 when there were incisive changes in the organization of agriculture, and it is also known that a serious food shortage occurred during 1960 and 1961 due, at least partly, to drought causing poor harvests. Famine was averted—thanks to a strict control of food distribution and considerable imports of food from abroad. Nevertheless, it is possible that some of the events since 1955 retarded the rapid progress in the reduction of mortality which might otherwise have been achieved. The net effect of the various circumstances is not easy to estimate.

In these circumstances, there was little choice but to adopt round figures within plausible ranges for the death rate or the expectation of life and their changes since 1950. Three alternative assumptions on this score were considered for the purpose of the present calculations. First, to represent a relatively pessimistic view, it was assumed that expectation of life rose to an average of 40 years in the period 1950-1955 and remained at the same average for 1955-1960 and 1960-1965. Second, for an intermediate view, an uninterrupted upward trend of expectation of life was assumed, from 40 years in 1950-1955 to 42.5 years in 1955-1960 and 45 years in 1960-1965. Finally, as an optimistic assumption, expectation of life was assumed already to have reached 45 years in 1950-1955 and to have risen

to 47.5 years in 1955-1960 and 50 years in 1960-1965. In all cases, in calculating the projections from 1965 onward, progress was assumed to continue thereafter at the rate of a 2.5-year increase in expectation of life in each successive five-year period.

(d) Migration

On the occasion of the 1953 census, the number of Chinese residing abroad was officially estimated as nearly 12 million, including the sizeable communities of Chinese origin in South-East Asia and the population of Hong Kong, but not China (Taiwan). Net emigration from China in recent decades must have been much less than 12 million since the Chinese communities abroad have grown also by natural increase. Having regard to the size of the population of the mainland and the uncertainty of data on births and deaths, migration can be disregarded as a factor in its trend up to the present time, nor is it likely to attain much importance, in this sense, at any foreseeable future time.

(e) Population estimates, 1950-1960

The calculations were based on the benchmark of the 1953 enumeration, totalling 582.6 million, as the most reliable population datum available for mainland China, although the methods of that enumeration were not uniform and data were gathered over a period of more than a year in some areas. An annual series of population estimates for end-year dates from 1949 to 1956 had been published by the Government on the mainland,¹⁰ and another figure for the end of 1957 had been published in a separate source.¹¹ These figures together with mid-

TABLE 10.1
Population estimates for mainland China, 1949-1957, according to official publications, and corresponding mid-year estimates as published by the United Nations

(In thousands)

| Year | End-year estimate (official source) ^a | Corresponding mid-year estimate (United Nations) ^b |
|----------------|---|---|
| 1949 | 541,670 | ... |
| 1950 | 551,960 | 546,815 |
| 1951 | 563,000 | 557,480 |
| 1952 | 574,820 | 568,910 |
| 1953 | 587,960 | 582,603 ^c |
| 1954 | 601,720 | 594,840 |
| 1955 | 614,650 | 608,185 |
| 1956 | 627,800 | 621,225 |
| 1957 | 646,530 ^d | ... |

^a For 1949-1956, *T'ung-chi Kung-tso*, No. 11 (14 June 1957).

^b *Demographic Yearbook*, 1962, table 4.

^c Census result.

^d *Ten Great Years* (Peking, 1960).

¹⁰ Published in *T'ung-chi Kung-tso* (Statistical Bulletin), No. 11, 14 June 1957.

¹¹ Published in *Ten Great Years* (Statistics of the Economic and Cultural Achievement of the People's Republic of China) (Peking, State Statistical Bureau, 1960).

year population estimates derived from them by the United Nations Secretariat are shown in table 10.1.¹²

Of the officially published figures, the 1953-1955 series is consistent with the 1953 enumeration and the vital registration data available for those years, this being the period when greatest efforts were made to co-ordinate the census, registration and vital statistics services of the country.¹³ The figure for 1952 was derived from administrative reports for provinces and municipalities, while estimates for 1949-1951 represent a rough extrapolation of the 1952-1955 series into the past. The 1956 estimate was the result of applying the apparent increase of 1955 for another year. The estimate for 1957, from a separate source, is not clearly related to the preceding series and may not be comparable. No population figures for any date subsequent to 1957 had been published officially when the present report was in preparation.¹⁴

For the purpose of the present calculations, the series of estimates calculated by this extrapolation was not retained.

2. *Alternative population projections, 1955-2000*

The projections began with a hypothetical population intended to represent that of mainland China in 1950, with such a composition by sex and age groups as would have resulted from an expectation of life of thirty years and a crude birth rate of 38.0 per 1,000 having prevailed over an indefinite period of time. For the 1950-1955 period, two different projections are made. First, assuming the sex-age adjusted rate to have remained constant at the same level as estimated above for earlier decades, namely, 37.91 per 1,000, and expectation of life to have risen to forty years in 1950-1955; consonant with a total of 582.6 million in 1953, the population would have totalled 557.9 million in 1950 and 599.7 million in 1955. The other projection for 1950-1955 was carried out in such fashion that the mid-year population totals would amount to 546.8 million in 1950 and 608.2 million in 1955, in accordance with the official population estimates published in various sources. This latter projection was calculated with the optimistic assumption that expectation of life had risen to forty-five years in 1950-1955, and it was found that the sex-age adjusted birth rate would then have had to amount to 41.82 per 1,000 in that period to cause the population to reach the officially estimated

number in 1955.¹⁵ For 1955-1960 and subsequent periods, additional variations of assumptions were introduced.

Because of the great uncertainty regarding recent, current and prospective future demographic conditions in mainland China, a scheme of five alternative projections from 1955 onward was devised in which three distinct fertility assumptions were combined with three mortality assumptions. Four of these alternatives proceeded from the first projection for 1950-1955, in which a population total of 599.7 million was reached in 1955. The fifth alternative continued the calculation made in conformity with the official population total of 608.2 million in 1955.

The first set of four alternatives was obtained by combining each of two mortality assumptions with each of two fertility assumptions. On the pessimistic assumption, expectation of life would not advance beyond forty years until 1965. It would rise to 42.5 years by 1965-1970, and by 2.5 years in each successive five-year period; thus, by 1995-2000, the expectation of life would amount to 57.6 years. On the more favourable assumption, expectation of life would rise to 42.5 years in 1955-1960, forty-five years in 1960-1965, and so forth, attaining 63.2 years by 1995-2000, which is comparable to the level now prevailing in certain areas where recent public health achievements were notably outstanding, such as Ceylon and Singapore. A decline in fertility, resulting in a halving of the sex-age adjusted birth rate within thirty years was assumed for all the alternatives, but with different assumptions as to the date of beginning of the decline. According to one assumption, this decline would already have begun in the years following 1955 and would therefore be completed by 1985; according to the other, such a decline would begin no sooner than 1970 and run its course by the end of the century.

Finally, the fifth alternative was calculated so as to coincide with the population estimates of 546.8 million and 608.2 million, respectively, in mid-year 1950 and 1955 (as shown in table 10.1), which are compatible with a higher expectation of life, as well as notably higher fertility, during 1950-1955 as stated. In this alternative, expectation of life was assumed to rise to 47.5 years in 1955-1960, 50.0 years in 1960-1965, and similarly in subsequent periods, attaining 68.2 years by 1995-2000, comparable to the recent level in Japan. The sex-age adjusted birth rate was assumed to remain at 41.82 also during 1955-1960, to average again 37.91 during 1960-1965 and 1965-1970, and then undergo, from 1970 onward, the same decline assumed for the preceding alternatives.

It will be noted that in all these alternatives an eventually large decrease of fertility has been assumed, either coming into effect in 1970 or having already begun in 1955. While the timing, rapidity and extent of such a decline cannot be predicted, the probability of its occurrence within the next few decades appears high. It is related to economic and social changes which will almost certainly occur in a country where the Government has taken strong initiatives to overcome long standing obstacles to progress. The communal organization of agriculture,

¹² When end-year official population estimates are supplied by Governments it is the practice of the United Nations to derive a mid-year estimate equal to the average of the estimates for the end of the preceding and given year.

¹³ John S. Aird, *The Size, Composition, and Growth of the Population of Mainland China* (United States Bureau of the Census, International Population Statistics Reports, Series P-90, No. 15, Washington, D.C., 1961).

¹⁴ The United Nations Secretariat had calculated unofficial population estimates for certain recent years by applying the average 1953-1957 rate of increase shown by the official estimates, i.e., 2.4 per cent per year. Continuing at this rate, the populations would have grown to 686.4 million by mid-year 1960 and surpassed 700 million in 1961. While it is possible that the population did, in fact, grow at such a rate, indefinite continuation of an extrapolated series leads to increasingly dubious results as the period of time for which official data are lacking lengthens. Nor can a series of extrapolated population totals be regarded as the equivalent of a population projection in which the interactions of fertility, mortality and age composition are taken into account.

¹⁵ Evidently, these two projections could have been calculated with different assumptions as to mortality and fertility in the period 1950-1955, but such a procedure would have complicated the calculations without greatly affecting the results.

the diversification of the role of women, the emphasis given to education and acquisition of industrial skills, and other social changes to which mainland China is committed are apt to favour an eventual reduction in the average size of families. Since fertility appears to have been "moderately high" for some time past, it can be presumed that a measure of fertility control, whether by delayed marriage and celibacy or by other means, is already inherent in the culture and likely to be reinforced by social changes, prospective and already in progress. Eventually, decreasing mortality as well as continuing changes in the social and economic structure of the country would be likely to strengthen motivation for keeping families small. Furthermore, the Government has adopted a policy of encouraging the limitation of births. It is true that a great variety of more or less plausible assumptions of future fertility trends in mainland China could have been drawn up, but a larger number of alternative projections would hardly serve a useful purpose.

trends of the types described, which would gather momentum in the years to come. In a country of such size and geographic diversity, it is quite possible that delays would occur before the assumed large changes in mortality and fertility would acquire the assumed momentum throughout its large territory.

The results of these calculations, shown in table 10.2, are a series of population totals diverging widely as time lengthens. For 1955, the population is estimated between 600 and 608 million, and for 1960 between 639 and 676 million. The differences widen so that by the end of the century the population would be between less than 900 and nearly 1,400 million. Present uncertainty as to the size and current trends of the Chinese population is so great that such a variety of possibilities must be allowed for.

A doubling of the 1960 figure would occur in the four decades on the assumption that mortality fell off very sharply already in recent years while fertility temporarily

TABLE 10.2
Population of mainland China, 1955-2000 (millions), according to variously combined assumptions regarding trends in mortality and fertility

| Year | Alternative combinations ^a | | | | | Average of II and III VI |
|----------------|---------------------------------------|---------|-------|---------|---------|--------------------------------|
| | I | II | III | IV | V | |
| 1955 | 599.7 | 599.7 | 599.7 | 599.7 | 608.2 | 599.7 |
| 1960 | 639.4 | 641.7 | 645.8 | 648.1 | 675.7 | 643.7 |
| 1965 | 672.7 | 684.2 | 691.5 | 703.5 | 740.6 | 687.8 |
| 1970 | 704.3 | 735.3 | 734.4 | 767.4 | 815.5 | 734.9 |
| 1975 | 735.1 | 794.8 | 774.1 | 839.8 | 902.7 | 784.5 |
| 1980 | 762.2 | 857.7 | 811.9 | 916.8 | 1,001.9 | 834.8 |
| 1985 | 786.5 | 919.6 | 847.0 | 994.1 | 1,103.6 | 883.3 |
| 1990 | 812.0 | 978.8 | 883.9 | 1,070.0 | 1,203.4 | 931.4 |
| 1995 | 839.7 | 1,032.8 | 924.1 | 1,141.5 | 1,296.8 | 978.5 |
| 2000 | 868.0 | 1,083.3 | 965.3 | 1,210.0 | 1,386.2 | 1,024.3 |

^a As explained in the text, the alternatives represent the following combinations:
I. High mortality and early fertility decline.
II. High mortality and late fertility decline.
III. Low mortality and early fertility decline.
IV. Low mortality and late fertility decline.
V. Very low mortality, temporarily high fertility and late fertility decline.
VI. Average of alternatives II and III.

The results of the five projections described in the foregoing are brought together below in table 10.2. In addition, a sixth alternative is drawn, which is the average of alternatives II and III. The variants represent the following combinations:

- I. High mortality and early fertility decline;
- II. High mortality and late fertility decline;
- III. Low mortality and early fertility decline;
- IV. Low mortality and late fertility decline;
- V. Very low mortality, temporarily high fertility and late fertility decline; and
- VI. Average of alternatives II and III.

The conditions of mortality and fertility under which population would grow in accordance with the last-mentioned alternative are not exactly specified, but such growth of the population might be the result of either unequal or somewhat slow recent changes in demographic

rose about 10 per cent higher than it seems to have been in earlier decades (variant V). According to the other combinations (variants I to IV), between 1.4 and 1.9 times the population estimated for 1960 would be attained by the century's end. In the short run, such as up to 1970, progress in the decline of mortality may be the major factor determining the rate of population growth, while in the longer run this depends more on the time at which fertility begins to undergo a large decrease. The relative effects of assumed trends in mortality and fertility are made apparent by a comparison of alternatives II and III. Reference may also be made to alternative VI, in which alternatives II and III are averaged. The probability that the population trend in mainland China will resemble alternative VI is not distinctly greater than that it will approximate any of the others; but if the average assumptions combined in this alternative constitute a rational guide, a fairly constant annual increase by 10

million or decennial increases by nearly 100 million may be regarded as among the various reasonable expectations. Such nearly constant numerical increases would imply a slowly diminishing proportionate rate of increase.

3. *Selected variants and rounded figures*

Table 10.2 was prepared to illustrate the results of the calculations carried out on the basis of the 1953 census total and other data, methods and assumptions, as described above. For all alternatives except V, it will be noted, the 1955 population estimate is the same and the estimates for 1960 are not far apart.

However, it is inconvenient for world-wide comparisons to retain a choice of 1960 estimates for China while uniform estimates are used elsewhere. Since there cannot be much confidence in the accuracy of any of the estimates, rounded figures are to be preferred. The 1960 population, therefore, may be taken as 650 million for every variant, this being a sufficiently round figure in view of the possibility of errors by tens of millions. This estimate may be related to similarly rounded figures of 560 million in 1950 and 600 million in 1955. Future estimates were then pro-rated so as to conform with the rounded figure for 1960. Alternative V of table 10.2 was regarded as the "high" variant, alternative I as the "low", and alternative VI, which is the average of alternatives II and III, as the "medium" variant.¹⁶

The variant projections, thus pro-rated, are shown in annex 3, tables A3.2-A3.4. They indicate a high rate of population growth to be maintained for three decades on the "high" assumption even though fertility is assumed to begin a decisive decline after 1970. On the "low" assumption, with early fertility decline and some retardation in the decline of mortality, population growth would soon be diminished to a moderate rate, though the absolute amounts of increase would continue to be quite substantial. On the "medium" assumption, annual increases would remain of a constant order of magnitude until the end of the century and the proportionate rate of increase would diminish gradually.

B. OTHER COUNTRIES OF EAST ASIAN MAINLAND REGION: HONG KONG, MONGOLIA AND MACAO

1. *Population growth, 1920-1960*

For Hong Kong, where a census was taken in 1961, demographic information is now quite accurate. Censuses have been taken decennially in Macao, but the vital statistics are very deficient. In Mongolia, censuses were taken in 1918, 1956 and 1963 and a vital statistics system has begun to furnish systematic information, although the accuracy of the latter is uncertain. According to available data, including interpolations for certain years in Mongolia, the population of the three areas has grown since 1920 as shown in annex 3, table A3.8.

The population of Hong Kong increased by nearly one million from 1930 to 1940, half a million from 1940 to 1950, and nearly another million from 1950 to 1960.

Annual estimates show that this growth occurred in irregular spurts, due to successive waves of immigration. The population of Mongolia is estimated to have grown slowly up to about 1950, but quite rapidly in the next decade. The census data for Macao show a doubling of the population in the 1920's, another doubling in the 1930's, reduction by one-half in the 1940's, and a slight further decrease from 1950 to 1960.

The comparatively large population figures for Hong Kong and Macao in 1940 reflect the presence of large numbers of refugees who subsequently returned to mainland China. In both Hong Kong and Macao, there are physical obstacles to the accommodation of a growing population. The mountainous terrain of Hong Kong affords only limited space for residential building, and the water supply can be increased only at great cost. Nevertheless, in the 1940's and 1950's, large numbers of immigrants were accommodated there and found opportunities for employment beyond what might have been thought feasible in earlier times.

Rates of natural increase in Hong Kong are considerably affected by distortions of age composition of the population which have resulted from migration. Birth rates in the range of 35-37 per 1,000 were recorded during the latter years of the 1950's. Crude birth rates of 34.2 and 32.8 were registered in 1961 and 1962, corresponding to gross reproduction rates between 2.4 and 2.5, a slight decrease being noted in the fertility of women aged more than thirty years; expected changes in age composition now tend to reduce the crude birth rate, and the reduction may become greater when fertility declines more.¹⁷ The death rate of Hong Kong, at one time exceedingly high, has been reduced drastically; rates as low as 5.9 and 6.0 per 1,000 were registered in 1961 and 1962, leaving a wide margin of excess of births over deaths. But the official data show Hong Kong's population to have increased by 335,000 from 1960 to 1962, attaining 3,410,000 in that year. About 150,000 of this population gain is attributed to immigration. The rising costs of housing and other essential supplies may eventually deter immigration at such rates, and the rate of natural increase may also diminish gradually with changing age composition and possibly declining fertility.

The vital statistics for Macao appear to be unreliable but the successive census counts suggest that any very large increase in the number of permanent residents might require some rather unprecedented development. The territory is only sixteen square kilometres.

In Mongolia, birth rates averaging 35.8 and death rates averaging 12.2 per 1,000 were recorded during 1955-1958, but it is not certain whether satisfactory registration had yet been attained. The registered rates show a rising trend which suggests improving registration. Comparison of the recent census figures with earlier population estimates shows an accelerating trend of growth which suggests a large recent rise in the rate of natural increase since migration was probably not a large factor. This might be due partly to increased fertility as well as reduced mortality, because the number of celibate monks—who comprised at one time a considerable proportion of adult males—has greatly diminished.

¹⁶ For variant on "constant fertility, no migration" see annex 3, table A3.5.

¹⁷ "Hong Kong: Country Statement" (paper submitted to Asian Population Conference, New Delhi, December 1963).

2. Population estimates, 1960-1980

Only rough conjectures were made regarding future population growth in these three areas. For Hong Kong, the assumption was a continuous annual increase of about 120,000—as actually occurred on an average of the 1952-1962 period—beginning with the total of 3,410,000 estimated for 1962.¹⁸ The population of Mongolia was assumed to maintain an annual rate of increase of 3 per cent. For Macao, the assumption was an annual increase of about 1,000. The resulting estimates are shown in annex 3, table A3.8.

C. TOTAL FOR THE EAST ASIAN MAINLAND REGION

Regional totals were obtained by adding the estimates for Hong Kong, Mongolia, and Macao to the corresponding estimates for mainland China, all figures being rounded to the nearest million. The same rough conjectures of future population in the three smaller areas were used in conjunction with each of the variant projections for China.

D. JAPAN

1. Population growth, 1920-1960

Population trends in Japan are well documented by results of censuses taken at five-year intervals since 1920 and accurate registration statistics of births and deaths. The population figures for the period 1920-1960 shown in annex 3, table A 3.8 (representing the total population within the country's present boundaries) and the vital statistics for 1920-1962 shown in table 10.3 can both be regarded as highly reliable.

Japan's death rate, which stood at the rather high level of 23.0 per 1,000 in 1920-1924, followed a gradually declining trend until the late 1940's, then dropped abruptly from 16.8 for 1945-1949 to 9.4 for 1950-1954, and has hovered about the low level of 7.5 per 1,000 since 1958. The birth rate in the 1920's was at the moderately high level of about 35 per 1,000 at which it appears to have stood since the middle of the nineteenth century if not earlier.¹⁹ The birth rate declined somewhat during the 1930's, but this trend was halted in the 1940's. After the war, the birth rate rose temporarily to a peak in 1947 of 34.3 per 1,000, then entered a swift decline which brought it down to 17.3 by 1958; since then, it has fluctuated about this low level. From the 1920's to the early 1950's, the changes in the birth and death rates approximately offset each other so that the rate of natural increase remained fairly constant in the range of about 12 to 14 per 1,000, but in the period since 1955, the decrease of the birth rate exceeded that of the death rate and the

natural increase rate dropped; it has been below 10 per 1,000 since 1960.

The decrease in the Japanese birth rate between 1947 and 1957 has no recorded parallel in demographic history for magnitude of the reduction within so short a time. It is all the more remarkable in view of the fact that the age composition of the population, inherited from previous trends, was such as to minimize the decrease of the birth rate resulting from the drastic reductions which occurred at this time in the specific fertility rates of women in child-bearing ages. The policy of the Government undoubtedly contributed to this remarkable decrease of fertility. An earlier pro-natalist policy was reversed in 1948; since that time the Government has permitted, if not favoured, wide propagation of family limitation mainly through the initiative of individuals, private organizations, the medical profession and mass media of communication. To a large extent, family limitation has been practised by means of clinical abortions but increasingly also by means of contraception. There has also been some deferment of marriage which, combined with drastic curtailment of fertility in older women, has resulted in an unusual degree of concentration of child-bearing within a narrow age-span.

TABLE 10.3

Crude birth rates, death rates and rates of natural increase in Japan, 1920 to 1962 (per 1,000 population)

| Period or year | Birth rate | Death rate | Rate of natural increase |
|---------------------|------------|------------|--------------------------|
| 1920-1924 | 35.1 | 23.0 | 12.1 |
| 1925-1929 | 34.1 | 19.8 | 14.3 |
| 1930-1934 | 31.9 | 18.1 | 13.8 |
| 1935-1939 | 29.3 | 17.4 | 11.9 |
| 1940-1944 | 30.1 | 16.3 | 13.8 |
| 1945-1949 | 30.1 | 16.8 | 13.3 |
| 1950-1954 | 23.7 | 9.4 | 14.3 |
| 1955-1959 | 18.2 | 7.8 | 10.4 |
| 1955 | 19.4 | 7.8 | 11.6 |
| 1956 | 18.5 | 8.1 | 10.4 |
| 1957 | 17.3 | 8.3 | 9.0 |
| 1958 | 18.1 | 7.5 | 10.6 |
| 1959 | 17.6 | 7.5 | 10.1 |
| 1960 | 17.2 | 7.6 | 9.6 |
| 1961 | 16.9 | 7.4 | 9.5 |
| 1962 | 17.0 | 7.5 | 9.5 |

In addition to the Government's policy, some other features of the situation in Japan were favourable to the quick decline of fertility after 1947. The earlier fertility level was only moderately high and not comparable to the present levels in the majority of developing countries; and a gradually declining trend had been initiated previously, during the 1930's. This trend had been interrupted in the 1940's by events connected with the Second World War. The levels of education and urbanization were high and substantial progress had been made in industrialization. The cultural homogeneity of the Japanese population also favoured quick diffusion of the changed pattern of values and behaviour pertinent to fertility.

¹⁸ The results of this rough assumption can be compared with those of detailed population projections calculated for the ten-year period 1961-1971 which, with varied assumptions, yielded population totals of 5,218,000, 4,813,000 and 4,389,000 for the year 1971. See Benjamin N. H. Mok, *Population Projections for Hong Kong, 1961-1971* (Hong Kong, Government Press, 1963).

¹⁹ Estimates for the second half of the nineteenth century appear in Yuzo Morita, "Estimated Birth and Death Rates in the Early Meiji Period of Japan", *Population Studies*, vol. 17 (July, 1963) (London), pp. 33-56.

The recent change in the birth rate entails a gradual change in the age composition of the population of Japan, favouring eventually a still lower crude birth rate even if fertility were to remain the same. On the other hand, there is a possibility of an appreciable rise in the birth rate if, for any reason, motivation for restricting the size of families should be diminished. Opinion surveys are being conducted on this subject and no indication of such a relaxation has become apparent. Analogy with the experience of other countries, such as those where birth rates fell to the lowest levels in the 1930's and recovered subsequently, may be irrelevant in the case of Japan. On the other hand, no large country has maintained such a low level of fertility as that now found in Japan over any very extended period of time.

The decrease of the death rate in Japan has slowed down and is unlikely to continue much further. In fact, the changes in age composition of the population caused by the recent decline in the birth rate will eventually tend to raise the crude death rate even though age-specific death risks may still be reduced.

Expectation of life at birth (both sexes) rose from about forty-four years at the beginning of the century and forty-eight years in the 1930's to fifty-eight years by about 1950 and sixty-eight years by 1960, showing a remarkable acceleration. However, as health conditions now approach the best found in other parts of the world, further gains in expectation of life are apt to be slow.

Some migration into and out of Japan has occurred at various times. Some Japanese have migrated to the Americas and to Hawaii, and there has been movement in both directions between Japan and Korea, particularly in the 1930's and 1940's. During the period of expansion of the Japanese Empire, administrators and settlers moved from Japan to outlying areas, most of whom were repatriated after 1945. The Ryukyu Islands lost many migrants to Japan in previous decades, though not recently.

At present, there are no indications that migration will occur in the future at rates that would much affect the growth of population in Japan.

2. Projections

Population projections have been carried out in Japan repeatedly for many years in the past.²⁰ Recently, they have been recalculated at brief intervals, each time with such revisions as were indicated by continuous study of component demographic trends, opinion surveys related to family formation and family planning, and general considerations regarding the prospects of economic and social change. The latest projection available, published in 1960,²¹ is based on assumptions of trends regarded as most plausible for the near future. An extrapolation of these trends into the remote future is also included, though

²⁰ See I. B. Taeuber, *The Population of Japan* (Princeton University Press, New Jersey, USA, 1958), pp. 325 ff., and the brief summary given in *The Population of Asia and the Far East, 1950-1980*, op. cit., pp. 32-33.

²¹ Institute of Population Problems, Ministry of Health and Welfare, Government of Japan, *Future Population Estimates for Japan by Sex and Age* (Research Series No. 138) (1 August 1960). Estimates refer to 1 October of each year.

not with the explicit judgement that they should be expected to continue so long.

The official projection published in 1960 ("medium" assumption) has been selected to represent the "medium" or most likely expectation of population growth up to 1980, with the following modifications:

(i) The figures were adjusted so as to coincide with the population estimate for mid-year 1960.

(ii) The official projection assumes some mortality decline until 1970 but none thereafter; it is assumed here that mortality will decrease from 1970 onward in accordance with the generalized assumption of this report, i.e., until an expectation of life at birth of 73.9 years is attained, which would be by 1985-1990.

(iii) The official projection assumes a decrease in the gross reproduction rate to 0.93 in 1960-1965 and 0.87 in 1965-1970, fertility thereafter remaining constant. It is assumed here that a slight rise in fertility will occur after 1970 so that the gross reproduction rate will again reach 1.0 by 1980, and this level is maintained when the projection is extended further into the future.

The modifications for periods following 1970 have been made mainly for the sake of comparability with the projections shown in this report for other parts of the world. The assumption that the gross reproduction rate will eventually return to unity is founded mainly on the observation that below-unity reproduction rates in other countries have never been maintained very long.

These assumptions give the "medium" population estimates up to 1980 shown in annex 3, table A 3.8, implying an almost constant, moderate rate of growth except for a temporary slow-down in 1965-1970. The projected growth is decidedly slower than that of many preceding decades.

For the "high" and "low" variants, the mortality assumptions of the "medium" projection stated in the preceding section were retained, but the fertility assumption was varied. The "high" and "low" variants up to 1970 were made to conform with the alternative assumptions of the official projection, but variant assumptions were made for the period after 1970 with regard to the extent and speed of recovery of fertility. For the "high" variant, it was assumed that the gross reproduction rate would fall only to 0.95 by 1965, then rise continuously to attain 1.25 by 1980 and remain at that level thereafter. The level of 1.25 was taken as representing the current average level of fertility in the countries of Europe, in some of which a similar recovery has been noted in the past. For the "low" variant, it was assumed that the gross reproduction rate will drop to 0.78 in 1965-1970, then to recover very slowly so as to regain the level of 1.0 only at the end of the century. All these changes were assumed to occur in linear fashion.

The results of the several projections over the period 1960-2000 tabulated in annex 3 all agree in showing diminishing rates of population growth in the last two decades of this century. This tendency is inherent in the change of age structure which has already resulted from the declining and low birth rates of the past fifteen years. With an early recovery of fertility to the present European average level, as in the "high" variant, population would continue growing in the 1970's at a rate comparable

TABLE 10.4
Population of Korea, 1920-1960

| Census date | Korean population (thousands) | | | Intercensal increase (per cent) | | |
|----------------------------|-------------------------------|--------------------------------|--------------------------|---------------------------------|-------------------|-------------|
| | Entire country ^a | Republic of Korea ^a | North Korea ^b | Entire country | Republic of Korea | North Korea |
| 1 October 1920 | 17,264 | ... | ... | ... | ... | ... |
| 1 October 1925 | 19,020 | ... | ... | 10.2 | ... | ... |
| 1 October 1930 | 20,438 | ... | ... | 7.5 | ... | ... |
| 1 October 1935 | 22,208 | ... | ... | 8.7 | ... | ... |
| 1 October 1940 | 23,547 | ... | ... | 6.0 | ... | ... |
| 1 October 1944 | 25,120 | 16,244 ^d | 8,876 | 6.7 | ... | ... |
| 1 May 1949 | 29,907 | 20,167 | 9,740 | 19.1 | 24.2 | 9.7 |
| 1 September 1955 | 30,532 | 21,502 | 9,030 | 2.1 | 6.6 | -7.9 |
| 1 December 1960 | 35,024 | 24,994 | 10,030 | 14.7 | 16.2 | 11.1 |

^a Source: *Korea Statistical Yearbook* (Seoul, Economic Planning Board, Republic of Korea, 1963). The figures do not relate to mid-year dates but to the varying dates of the censuses.

^b Obtained by subtracting figure for Republic of Korea from total. It is possible that these figures are underestimated. Thus the population of North Korea has been estimated at 10,789,000 for the end of 1960 according to "Ekonomika

Sotsialisticheskikh Stran v Tsifrah, 1962 g." (Izdatelstvo Sotsialno-Ekonomicheskoy Literatry, Moskva, 1963), p. 5.

^c It is not certain whether the 1920 census conformed to the standards of subsequent censuses.

^d Source: Taebin Im, "Population projections for the Republic of Korea (1960-1980)", *Monthly Statistics for Korea*, No. 11-12 (Bureau of Statistics, Economic Planning Board, Republic of Korea, 1963).

to that of recent decades. With a smaller and slower rise of fertility, as assumed in the "medium" and "low" variants, the population would become almost stationary by the end of the century.

E. KOREA

1. Population growth, 1920-1960

Population trends in Korea since 1920 are documented by censuses taken approximately every five years except that no census data for North Korea has been available since 1944. The completeness of registration of births and deaths has varied, but census data on age composition provide some means of estimating the approximate levels of fertility and mortality. The census figures (including estimates for North Korea) are summarized in table 10.4.

According to the data, the population grew fairly rapidly early in the 1920's and more slowly between 1925 and 1944. There was a very large increase in 1944-1949, very little increase in 1949-1955, and rapid growth again in 1955-1960. From 1944 to 1960, the population of North Korea apparently grew less than that of the Republic of Korea, and in 1949-1955 it decreased.

The 1920 count may have been deficient, but the fluctuating increases from 1925 to 1944 are probably to be attributed mainly to emigration, both to Japan and to the area of Manchuria then under Japanese tutelage. Otherwise, as mortality was probably decreasing, the rate of growth would have risen. Some Japanese also migrated to Korea, but their numbers were smaller than those of the Korean emigrants. The effects of migration were reversed in 1945-1948, when both Koreans and Japanese were repatriated. In addition, a large number of refugees, estimated at 1,835,000,²² moved from North Korea to

the Republic of Korea during that time. The net effect of these transfers was an extraordinary population increase in the Republic of Korea during 1944-1949, whereas the increase shown by estimates for North Korea was comparatively moderate. During the hostilities of 1950-1952, a large number of war casualties occurred in both parts of the country. The loss is still reflected in deficits of males of certain age groups in the censuses of the Republic of Korea. In addition, an estimated 996,600 refugees²³ moved from North to South, partly offsetting the loss by war casualties in the Republic of Korea while causing an absolute decrease of the population in North Korea during 1949-1955. There was probably little migratory movement between the two parts of the country during 1955-1960, a period in which the population of the Republic of Korea is estimated to have increased at a higher rate than that of North Korea.

Most of the effects of migration and war casualties are cancelled out when the population totals for the entire country in 1925 and 1949 are compared, and also those in 1955 and 1960. The comparisons show an average annual increase of 1.9 per cent for 1925-1949 and 2.8 per cent for 1955-1960, which may be taken as a rough indication of the extent to which natural increase accelerated.

There is ample evidence that complete registration of births has not yet been attained in Korea. In the years up to 1944, widely fluctuating birth rates were recorded, generally in the range from 30 to 40 per 1,000, whereas census data on age composition of the population suggest birth rates of the order of 45 per 1,000 with little apparent change. More recently, even lower birth rates have been registered in the Republic of Korea. In North Korea, on the other hand, a birth rate equal to 46.3 was reported for 1950; in 1959 and 1960 the birth rates were 39.3

²² *Population Survey of Korea*, vol. 6, No. 6 (June-July 1957) (Office of Public Information, Republic of Korea).

²³ *Ibid.*, p. 11.

and 38.5 respectively.²⁴ The recorded death rates averaged about 22 per 1,000 in the 1920's and decreased gradually to 18 per 1,000 in 1940, but independent calculations based on census data with allowance for migration suggest an average death rate of almost 28 per 1,000 in 1925-1930 and a decrease of a little more than 20 per 1,000 by 1935-1940.²⁵ Again, implausibly low death rates have recently been registered in the Republic of Korea, whereas a rate of 13.5 per 1,000 was reported for North Korea in 1950 and the rate became 12.0 in 1959 and 10.5 in 1960.²⁶ By comparing census data for the Republic of Korea, an average death rate of 16.0 has been estimated for the 1955-1960 period. Though neither the birth rate nor the death rate can be calculated with great accuracy, it is evident that fertility up to recent years was quite high and was not changing very much whereas mortality, previously very high, fell significantly in the 1930's and much more sharply in recent years.

Besides its proximity to, and cultural affinity with, both China and Japan, several factors in the present situation may favour a decline of fertility in Korea, beginning in the near future. In the Republic of Korea, the great majority of the adult population is literate and media of mass communication are well developed. Urbanization has advanced rapidly and nearly 40 per cent of the population is now in cities with 20,000 or more inhabitants, including an even larger proportion of young women. There are several indications that the average age at marriage has risen significantly. A family planning programme has been sponsored by the Government of the Republic of Korea since 1962. In North Korea, compulsory seven-year education was introduced in 1958 and it is noted that in 1960-1961 the total number of students amounted to almost a quarter of the entire population. There are also indications that the development of the national economy has been accelerated significantly as a result of the increase in the number of employed persons. While there is yet no clear evidence of a decline in fertility, the possibility that this may occur in a not very distant future seems to be strongly indicated. Meanwhile, further progress in the reduction of mortality is to be expected. According to estimates of the death rate, expectation of life at birth rose from about thirty-five years in the 1920's to nearly forty-five years during the 1930's and 52.5 years in 1955-1960.²⁷

2. Projections

Tentative population projections for the Republic of Korea were published in 1960 and 1962,²⁸ and another projection, calculated more recently and using detailed

results of the 1960 census, was published in 1963.²⁹ The latter was used with extensions and adaptations as needed.

No population projection was found for North Korea. For the purpose of the present report, the future population estimates for North Korea were calculated on the assumption that the crude birth rate of 38.5 per 1,000 in 1960 would start to decline in 1965 and would be halved in 30 years; as regards mortality, it was assumed that the crude death rate of 10.5 in 1960 would decline linearly to reach 7.4 per 1,000, which is the estimated rate for the region in 1975-1980.

As projected by Taebin Im, expectation of life in the Republic of Korea would rise from 55 years in 1960-1965 to 63.2 years by 1975-1980, while the sex-age adjusted birth rate, estimated as 47.17 per 1,000, would either remain constant or decline at various rates after 1960. Since there was no evidence of fertility decline already being in progress, the assumption of its onset as of 1960 was viewed as a "low" variant. Hence, adjustments were made to obtain a "medium" and perhaps more likely variant with 1965 as the date of onset. The form of the decline was assumed to correspond to the generalized assumptions as stated in chapter 9. The resulting "medium" projection for the Republic of Korea and those for North Korea and the totals for the entire country are shown in table 10.5. The figures indicate a gradually diminishing rate of population growth though the absolute amounts of increase in population rise.

On all alternative projections for Republic of Korea, the same mortality trend was assumed, namely, a rise in expectation of life from 55 years in 1960-1965 to 71.7 years by 1995-2000. The "high", "low", and "medium" variants each imply a thirty-year decline in fertility during which the sex-age adjusted birth rate of 47.2 is halved, according to the generalized assumption as to the form of transition from high to low fertility. As stated above, for the "medium", or most likely, projection, the decline was assumed to begin in 1965, and for the "low" variant, fertility was assumed to have begun decreasing in 1960. For the "high" variant, the decrease was assumed to start in 1975. The "low" variant differs only slightly from the results of the "low" assumption drawn up officially. For North Korea one projection based on the "medium" variant was prepared. The corresponding estimates for the entire country appear in annex 3, table A 3.8.

F. CHINA (TAIWAN)

1. Population trends, 1920-1960

Population trends for China (Taiwan) since 1920 are well recorded by periodic censuses and probably quite accurate registration of births and deaths, except that the records were interrupted during 1944-1947 and possibly were not so reliable in the immediately following years when the recording system was being reorganized. As shown in table A 3.9 population grew at a rapid rate in the decades since 1920 remaining at a very high level despite a slight set-back caused by war-time hardships

²⁴ "Ekonomika Sotsialisticheskikh Stran v Tsifrah, 1962 g.", op. cit., p. 68.

²⁵ Taebin Im, "Population Projections for the Republic of Korea (1960-1980)", *Monthly Statistics for Korea*, No. 11-12 (1963) (Bureau of Statistics, Economic Planning Board, Republic of Korea). In addition, a sample survey of fifty urban areas, conducted in 1955, gave a birth rate of 36.6 and a death rate of 21.2 per 1,000.

²⁶ "Ekonomika Sotsialisticheskikh Stran v Tsifrah, 1962 g.", op. cit., p. 68.

²⁷ Taebin Im, op. cit.

²⁸ Kim Yun, *Population Projections 1955-1975* (Bombay, India, Demographic Training and Research Centre, 1960); and *Monthly Statistics for Korea*, vol. 9 (1962) (Bureau of Research and Statistics, Economic Planning Branch, Republic of Korea).

²⁹ Taebin Im, op. cit.

TABLE 10.5
Population estimates for Korea, 1960-1980

| Year | Population (thousands) | | | Quinquennial increase (per cent) | | |
|----------------|------------------------|---------------------|---------------------|----------------------------------|-------------------|-------------|
| | Entire country | Republic of Korea | North Korea | Entire country | Republic of Korea | North Korea |
| 1960 | 35,265 | 24,665 ^a | 10,600 ^b | ... | ... | ... |
| 1965 | 40,755 | 28,648 | 12,107 | 15.6 | 16.1 | 14.2 |
| 1970 | 46,940 | 33,119 | 13,821 | 15.2 | 15.6 | 14.2 |
| 1975 | 53,718 | 38,075 | 15,643 | 14.4 | 15.0 | 13.2 |
| 1980 | 60,837 | 43,364 | 17,473 | 13.3 | 13.9 | 11.7 |

^a Mid-year estimate differs from census total of 1 Dec. 1960 shown in table 10.4.

^b Estimate of 10,789,000 for end of 1960 was adjusted to mid-year.

in the 1940's. More recently, the population of China (Taiwan) has been one of the fastest growing in the world. A threefold increase occurred in the period of forty years, 1920 to 1960.

Data on crude birth rates, death rates and natural increase are brought together in table 10.6. They show a moderate rise in the already high rate of natural growth during the 1930's, a large further rise in the early 1950's, and a noticeable slowing down from 1957 onward. The modifications are due to changes in both the birth and death rates.

The death rate was probably very high early in this century and decreased gradually and continuously until a rate of 16.2 per 1,000 was recorded in 1941. When the records were re-established after the war, a rate of 14.3 was registered in 1948 and it decreased rapidly and continuously to a level lower than 7 per 1,000 since 1960. From the statistics, an expectation of life at birth (both sexes) of forty-three years was calculated in 1936-1940, and this rose to sixty-three years by 1959-1960, though the estimate may be slightly excessive as a result of incomplete registration of infant deaths.

The birth rate early in the century appears to have been of the order of 40 per 1,000 and possibly slightly more. It rose to near 45 around 1935, then apparently subsided somewhat, and rose again above 45 during 1950-1954. Since 1956, decreasing birth rates have been recorded and they have shown a tendency to fall off further, below 40 per 1,000 since 1960. The rate of 37.4 in 1962 can still be regarded as moderately high, but it is decidedly lower than registered in any previous period. The decrease from 45.3 in 1955 to 37.4 seven years later is marked enough to suggest that a long-term downward trend may have set in. Though it is possible that the decrease in the birth rate will not proceed very far, there are not many countries with mortality as low as in China (Taiwan) where such high fertility has long been maintained. The point of view was adopted here that the decline in fertility was likely to continue for some time.³⁰

³⁰ On factors associated with the decline in the birth rate of China: Taiwan, see Freedman, Peng, Takeshita, and Sun, "Fertility Trends in Taiwan: Tradition and Change", *Population Studies*, vol. 16, No. 3 (March 1963) (London), pp. 219-236.

Migration has had some effect on population change in recent decades. During the period of Japanese administration, which lasted until 1945, a number of Japanese officials and settlers migrated to this island. After 1945, many of them were repatriated while many more numerous migrants arrived from the Chinese mainland, mostly during 1948-1954. In recent years, there has been comparatively little movement of people to or from China (Taiwan), nor are there now any indications to suggest future migration on a scale that would have much effect on population growth.

2. Projections

Two sets of population projections for China (Taiwan), both published in 1960, were available,³¹ and one of these

TABLE 10.6
Crude birth rates, death rates and rates of natural increase in China (Taiwan), 1920-1962

| Period | Birth rate | Death rate | Rate of natural increase |
|----------------------------------|------------|------------|--------------------------|
| 1920-1924 | 40.9 | 25.3 | 15.6 |
| 1925-1929 | 42.7 | 22.0 | 20.7 |
| 1930-1934 | 44.7 | 20.6 | 24.3 |
| 1935-1939 | 44.0 | 20.2 | 23.8 |
| 1940-1943 ^a | 41.1 | 18.3 | 22.8 |
| 1948-1949 ^b | 41.0 | 13.7 | 27.3 |
| 1950-1954 | 45.9 | 10.0 | 35.9 |
| 1955-1959 | 42.8 | 8.0 | 34.8 |
| 1955 | 45.3 | 8.6 | 36.7 |
| 1956 | 44.8 | 8.0 | 36.8 |
| 1957 | 41.4 | 8.5 | 32.9 |
| 1958 | 41.7 | 7.6 | 34.1 |
| 1959 | 41.2 | 7.2 | 34.0 |
| 1960 | 39.5 | 6.9 | 32.6 |
| 1961 | 38.3 | 6.7 | 32.6 |
| 1962 | 37.4 | 6.4 | 31.0 |

^a No systematic records for 1944-1947.

^b Records may be incomplete.

³¹ Tun-yih Lu, "Population projections for Taiwan, 1956-1976", *Industry of Free China* (January 1960); and Tun-yih Lu and Ka-Chi-Liu, *Population Projections for Taiwan, 1957-1982* (August 1960). The second of these projections was used with adaptations.

was chosen for the present purpose. When the projections were calculated, the possibility of a marked decrease in fertility was not yet apparent; an adaptation was therefore made for present purposes so as to take this decrease into account.

For the purpose of calculating the most likely future population trend, the position was taken that a fertility decline—corresponding to the generalized assumption for a transition from high to low fertility—had begun in 1955 and would run its full course by 1985. In this assumption, an acceleration of the decline during the 1960's was implied and the fertility level in 1985 would be half that of 1955; i.e., the sex-age adjusted birth rate, initially 43.4, would fall to 21.7 per 1,000. As regards mortality, in conformity with the available projections, expectation of life at birth (both sexes) was estimated to rise from 63.2 years for 1960-1965 to 70.2 years by 1980 and to be stabilized at 73.9 years in the 1990's. With these assumptions, population would grow as shown in annex 3, table A 3.8, i.e., by slightly increasing amounts but at a diminishing rate.

Variant projections up to the year 2000 were calculated with different assumptions as to the level at which fertility would eventually be stabilized. As stated above for the "medium", or most likely, assumption, a halving of the 1955 level was anticipated, bringing the sex-age adjusted birth rate down to 21.7 per 1,000 in 1985. However, as the present situation was already a shifting one, for the "high" and "low" assumptions the declines were taken as proportionate but larger or smaller, so that the sex-age

adjusted birth rate would settle at either 25.0 or at 16.0 per 1,000 in 1985.³²

The population projection up to the year 2000 corresponding to these variant assumptions are tabulated in table 10.7; corresponding totals for the region of Other East Asia appear in annex 3, tables A 3.2 to A 3.4. It seems likely that populations will at least double between 1960 and the year 2000, but a tripling seems unlikely in view of the fertility decline already in progress.

G. RYUKYU ISLANDS

Censuses have been taken periodically in the Ryukyu Islands over a number of decades and vital registration statistics have been kept. The records on births and deaths have been lost for some of the years of the Second World War, but are believed to have become fairly accurate in recent years.

The population remained almost constant from 1920 to 1940, according to the results of the census, then increased 22 per cent in the 1940's, and 25 per cent in the 1950's. Though there were appreciable excesses of births over deaths in the 1920's and 1930's, the natural increase at that time was mostly compensated by an almost equally large balance of emigration to Japan; more recently, emigration from the Ryukyu Islands has been much reduced if not almost negligible.

In the 1930's, the birth rate fluctuated about 26 per 1,000 and the death rate was of the order of 16 to 17 per 1,000 in a population depleted of young adults as a result of emigration. A great decline in birth and death rates has been registered since 1950. The recorded birth rate fell from 41.1 per 1,000 in 1950 to 27.6 in 1955, to 23.1 in 1960, and to 22.5 in 1962; the death rate fell from 9.7 per 1,000 in 1950 to 6.0 in 1955, to 5.1 in 1960, and to 5.4 in 1962. Most of the population increase of the 1950's was natural: there was only a small migratory balance.

Whereas a further decline of the birth rate and consequently a slackening rate of natural increase appeared plausible for the future, the possibility that migration might again become important could not be overlooked and made any forecast uncertain. For the present purpose, it was assumed that the population of the Ryukyu Islands would increase in the future at an average of the rates calculated for Japan and for China (Taiwan), according to the respective "medium" assumptions.

TABLE 10.7

Variant population projections for China (Taiwan), 1960-2000

| Year | "High" Variant | "Low" Variant | "Medium" Variant |
|--------------------------------------|-------------------|------------------|---------------------|
| <i>Population (thousands)</i> | | | |
| 1960 | 10,612 | 10,612 | 10,612 |
| 1970 | 13,853 | 13,572 | 13,754 |
| 1980 | 17,630 | 16,409 | 17,180 |
| 1990 | 21,957 | 18,878 | 20,819 |
| 2000 | 26,917 | 21,258 | 24,781 |
| <i>Decennial increase (per cent)</i> | | | |
| 1960-1970 | 30.5 | 27.9 | 29.6 |
| 1970-1980 | 27.3 | 20.9 | 24.9 |
| 1980-1990 | 24.5 | 15.0 | 21.2 |
| 1990-2000 | 22.6 | 12.6 | 19.0 |

³² This procedure is a departure from the form of the generalized assumptions with respect to decline from an initially high level of fertility, China (Taiwan) being rather exceptional in so far as such a decline now seems to be in progress.

Chapter 11 SOUTH ASIA

A. MIDDLE SOUTH ASIA

1. Population growth, 1920-1960

In India, Pakistan and Ceylon, censuses have been taken periodically over long past periods. Censuses have been taken repeatedly in Nepal, Sikkim and the Maldiv Islands, and recently also in Iran, but not yet in Afghanistan and Bhutan. The census results for the area of Pakistan in 1931 and 1941 are questionable for accuracy; the censuses of India in 1951 and 1961 excluded certain areas. Birth and death registration approach completeness in Ceylon, while in India and Pakistan, birth rates and death rates have been estimated either by the "reverse-survival" method from census data or from results of sampling surveys and local investigations. The long-run population trend in the region of Middle South Asia as a whole is well documented by the censuses, but information on trends in fertility and mortality is less comprehensive and less exact.

The decennial population estimates for the Middle South Asian countries since 1920, brought together in annex 3, table A3.8, are mostly official estimates but in some instances they have been adjusted for purposes of comparability. In the case of Pakistan, a revision of the 1961 population total prepared by the Planning Commission has been adopted.¹ Rounded figures were substituted in the case of India, where territorial coverage of the censuses varied somewhat, and for Pakistan, where the census counts of 1931 and 1941 are dubious; the same was also done for Iran, Afghanistan, Nepal and Bhutan, where for the lack of a consistent official series for the entire period, interpolations had to be made.

For the region as a whole, the series of estimates shows an acceleration of population growth in the 1930's and again on a larger scale in the 1950's. In the 40-year period, the regional population increased almost 75 per cent. The rates of increase in Iran, Afghanistan and Nepal are dubious; they were obtained from an attempted reconstruction of a series of figures linking recent official population estimates with estimates made near the beginning of the present century. Among the reliably documented countries, Ceylon stands out with a sudden jump to a very high rate of population growth in the 1940's. More recently, the population of Pakistan and of Iran appears to have been growing very rapidly, and the acceleration of growth in India has been considerable.

¹ Perspective Planning Section, Planning Commission, Government of Pakistan, *Population Projections for Pakistan* (May 1964) (mimeographed). This estimate implies an adjustment for presumably considerable under-enumeration in the 1961 census, from 93,832,000 to 101,450,000.

2. Fertility

Ceylon is the only country in the region where birth registration is nearly complete. Here, birth rates fluctuating in the range of 35 to 42 per 1,000 have been recorded in the course of a number of decades. From a previously lower level, the rate rose to an average of 40.6 in 1925-1929, fell to 35.6 in 1935-1939, rose again to around 38 in 1945-1949 and 1950-1954, and subsequently declined to 36.6 per 1,000 in 1960. These fluctuations may be cyclical; hence, the recent slight decline need not be regarded as a decisive downward trend. According to a verifying sample of 1953, 88 per cent of all births in that year were registered.² If the deficiency of registration was about the same in 1960, the actual birth rate in that year was slightly over 40.

For India, a birth rate of 39.1 per 1,000 was found in a national sample survey of 1958, probably underestimated to a slight extent as a result of omissions in reporting.³ By an examination of census data on age composition of the population, the birth rates of India (or former British India) in decades preceding 1950 have been variously estimated at figures in the range of 40 to 50 per 1,000. One estimate for the 1940's is 39.9 per 1,000,⁴ but in this estimate the level of infant mortality may have been underestimated and insufficient account may have been taken of the deficiency in enumeration of young children in the census. The estimate of India's birth rate in the years shortly preceding 1951 retained for the present purpose was 43.2 per 1,000,⁵ and it has been assumed that the rate dropped to 41.9 per 1,000 by 1961.⁶ The considerable variability of the birth rate among regions of India is worth noting: estimates indicate that in large parts of the country the rate is decidedly below 40 per 1,000 and in other large parts it is well above 40.

The birth rate of Pakistan is probably appreciably higher than that of India. The Muslim population of pre-partition India was found to have appreciably higher ratios of children to women and recent studies have indicated higher fertility for Muslims than for Hindus in the Indian

² Ceylon, Department of Census and Statistics, *Post-enumeration Survey 1953*, p. 15.

³ According to the fourteenth round of the National Sample Survey of India.

⁴ Estimate by the Registrar-General of India, based on 1951 census.

⁵ Estimate implied in population projection for India in A. Coale and E. Hoover, *Population Growth and Economic Development in Low-Income Countries*, Princeton University Press, New Jersey, USA, 1958).

⁶ This rate corresponds to the same projection, assuming decline in mortality and constant fertility. The Expert Committee on Population Projections used an estimate equal to 195 for the general fertility rate or a crude birth rate of 41.00 per 1,000 for 1951-1960 and assumed that this rate would remain constant through 1966.

Union.⁷ In the present state of information, the birth rate can be estimated only with much uncertainty. Thus, while a birth rate of 48 per 1,000 has been estimated for Pakistan as an average over the period 1946-1961 from census data on age composition,⁸ the Planning Commission's Report gives for 1961 an estimate as high as 57 per 1,000 in East Pakistan and an estimate equal to 52 per 1,000 in West Pakistan.⁹ For the purposes of the present study, a birth rate equal to 51 in 1956-1961, derived by reverse-surviving the children aged 0-4 in the Planning Commission's revision of the 1961 census, has been adopted for the whole country and assumed to have been constant up to 1965.¹⁰

A birth rate of 48 per 1,000 has been estimated for Iran, and 45 per 1,000 for Nepal.¹¹ In the absence of any basis for estimates for Afghanistan and Bhutan, it was assumed for the purpose of the present report that the birth rates of these countries were of the same order of magnitude as the rates for Iran and Nepal.

3. Mortality

Death registration is probably nearly as accurate in Ceylon as the registration of births.¹² According to registered rates, a drastic reduction in mortality occurred from 1947 onward. The death rate averaged 27.8 per 1,000 in 1921-1925, 24.5 in 1935-1939, and 19.7 in 1940-1944. In 1946 it stood at 19.8, then fell to 14.0 in 1947 and 12.9 in 1948; it continued moving downward, reaching 10.8 by 1955 and 8.6 by 1960. Much of the suddenness of the decline in the death rate during 1946-1948 can be attributed to the success of a campaign of malaria eradication. According to life tables based on the registers of deaths, expectation of life at birth (both sexes), which was 32 years in 1920-1922 and 43 in 1946, attained 54 years in 1948 and nearly 60 years by 1954. When allowance is made for the omission of some deaths, it remains probable that an expectation of 60 years or more was attained by 1960.

In India, official life tables calculated for inter-censal periods indicate an average expectation of life at birth of 27 years in the 1920's, rising to 32 years in the 1940's. During the 1950's, according to national sample surveys, the death rate declined considerably, making it appear probable that expectation of life now considerably exceeds 40 years and possible that it is near 45 years.¹³ Statistical information in this respect is more dubious in the case of Pakistan. It has been assumed here that the expectation of life was 40 years in 1956-1961 and 42.5 years in 1961-1965.

A death rate of the order of 30 per 1,000 was estimated from census data for Nepal for 1952-1954; it is possible that

the rate fell somewhat lower by 1960. For Iran, Afghanistan and smaller areas in the region, accurate information is lacking. In Iran, judging by the estimated birth rate and the estimates of population growth, mortality must have been quite high until fairly recently.

4. Migration

There was a sizable movement of labourers from India to Ceylon in the 1920's, and it is believed that recently there has been some emigration from Afghanistan, Bhutan and Nepal to neighbouring areas in India and Pakistan. A large exchange of population occurred between India and Pakistan at the time of partition.¹⁴ In earlier periods there was some emigration from India and Pakistan to other parts of the world, notably to South-East Asia, but it was never large in proportion to the population in India or Pakistan. There are now no apparent reasons for expecting large international movements in the future, either within this region or out to other parts of the world.

5. Population projections, 1960-1980

Population projections for India calculated during the 1950's fell short, in most cases, of the population total enumerated in 1961.¹⁵ The reasons may have been under-estimation of the extent of mortality decline that would result from nation-wide malaria control and other public-health measures; more accurate census enumeration in 1961 than in 1951; or possibly an unanticipated rise in fertility as a consequence of the improved state of health. A new population projection taking into account the detailed age returns of the 1961 census had not yet become available when the present calculations were undertaken.¹⁶ One of the earlier projections which came nearer than others to the 1961 census figures was used with adaptations as needed.¹⁷

Population projections for Ceylon at quinquennial intervals up to 1981 had been calculated officially¹⁸ and these were used after advancing the dates by one year and by pro-rating so as to make them agree with the population estimate for 1960. For the future trend of fertility, the "slow-decline" variant in the official projections for Ceylon was selected.

For other areas in this region, no population projections calculated by the component method were found and since their birth rates and death rates are not known with much

⁷ *Population Bulletin of the United Nations*, No. 7 (Sales No.: 64.XIII.2), p. 48.

⁸ *Ibid.*, p. 43.

⁹ Perspective Planning Section, Planning Commission, Government of Pakistan, *Population Projection for Pakistan*, op. cit., p. 4.

¹⁰ A model life table with life expectancy equal to 40.0 years in 1956-1961 was utilized.

¹¹ *Population Bulletin of the United Nations*, No. 7, op. cit., pp. 55 and 58.

¹² According to verifying sample of 1953.

¹³ According to the fourteenth round of the National Sample Survey of India, a death rate of 19.2 was found in 1958, suggesting expectation of life of 45 years at that date, but the death rate might have been understated as a result of omissions.

¹⁴ India received an estimated 7,249,000 displaced persons from Pakistan, and Pakistan received an estimated 7,227,000 from India, according to census data of 1951.

¹⁵ *Census of India, 1951, vol. I, Part I-A: Das Gupta and Majumdar, India: 1951-2001, Population Projections* (Indian Statistical Institute, 1954); Registrar-General, *Estimates of India's Population for 1961 and 1966* (New Delhi, 1959); Planning Commission, "Population projections pending 1961 census for use in the preparation of the draft outline of the Third Five Year Plan", *Monthly Abstract of Statistics* (Dec. 1959); and S. N. Agarwala, "Some Projections of India's Population", *India's Population* (Bombay, Institute of Economic Growth, 1960) (proceedings of a seminar).

¹⁶ A projection in line with provisional new census results was made by a committee of experts in May 1961, being largely an adaptation of previous projections.

¹⁷ A. Coale and E. Hoover, op. cit.

¹⁸ S. Selvaratnam, *Population Projections for Ceylon, 1956-1981* (Colombo, National Planning Council, 1959).

accuracy (indeed, not known at all for some of the countries), simplified population models were used for projections.¹⁹

The projection selected for India was calculated for dates from 1961 to 1981. As in the case of Ceylon, the dates were advanced by one year and the figures pro-rated to agree with 1960 population totals. The projection implies an expectation of life of about 43 years for both sexes in 1960, rising to 49 years by 1970 and 52 years by 1980. The crude birth rate implied in the projection for the year 1960 is 41.9 per 1,000 in India. For the future trend of fertility, a fertility decline conforming to the generalized assumptions in this report was assumed to begin in 1970.

For Pakistan, the age distribution as adjusted by the Planning Commission was utilized as a basis for the projections.²⁰ The expectation of life was assumed to have been 42.5 years in 1961-1965 and to score annual gains from 1965 onward in accordance with the general assumptions concerning mortality decline that have been adopted in this report. As regards fertility, the decline which conforms to the generalized assumptions was taken to begin in 1970.

The projections derived from the above assumptions for the countries in Middle South Asia are shown in annex 3, table A3.8. The sums of estimates for individual countries differ only slightly from the results of the "medium" long-range projection for the region. No change in fertility in other countries of the region was assumed for the purpose of the present set of projections to occur before 1980.

6. Variant and long-range projections

The three variant projections of the population of India and Pakistan up to the year 2000 are shown in table 11.1; corresponding totals for the region of Middle South Asia appear in annex 3, tables A3.2 to A3.4. The projected regional totals were calculated by pro-rating on the assumption that the population in the remainder of the region would grow at the same rates projected for the combined population of India and Pakistan.²¹

Up to the year 1980, the "medium" variants for India and Pakistan shown in table 11.1 are the same as the projections described above for these two countries. The extension up to the year 2000 was made by allowing the decline of fertility assumed to have begun in 1970 to continue in accordance with the generalized pattern of assumptions as described in chapter 9 so that fertility would fall by 2000 to one-half of the initial level. The assumed trend of declining mortality rates was also continued beyond 1980.

The "high" and "low" variants for India and Pakistan were calculated by letting the decline of fertility begin

¹⁹ See Model CDEF in *The Future Growth of World Population* (United Nations publication, Sales No.: 58.XIII.2.), p. 43. The gross reproduction rate was assumed equal to 3.0. Expectation of life in 1960 was assumed to be 35 years in Afghanistan, Nepal, Bhutan and Sikkim, and 40 years in Iran. The population of the Maldives Islands was assumed to increase at a constant arithmetic rate.

²⁰ Perspective Planning Section, Planning Commission, Government of Pakistan, *Population Projection for Pakistan*, op. cit., table 1.

²¹ The pro-rating was done in respect of the 1960 estimates; totals in the "medium" variant for 1970 and 1980 differ slightly from the sums of estimates for individual countries.

TABLE 11.1
Variant population projections for India and Pakistan,
1960-2000 (millions)

| Years | "High" variant | "Low" variant | "Medium" variant |
|-----------------|---------------------|------------------|------------------|
| | Fertility declining | | |
| | From 1980 onward | From 1965 onward | From 1970 onward |
| <i>India</i> | | | |
| 1960 | 432.7 | 432.7 | 432.7 |
| 1970 | 543.2 | 541.0 | 543.2 |
| 1980 | 696.3 | 661.5 | 682.3 |
| 1990 | 896.8 | 782.9 | 831.2 |
| 2000 | 1121.7 | 908.0 | 981.1 |
| <i>Pakistan</i> | | | |
| 1960 | 100.0 | 100.0 | 100.0 |
| 1970 | 134.2 | 133.6 | 134.2 |
| 1980 | 188.0 | 174.9 | 182.8 |
| 1990 | 265.1 | 215.9 | 236.6 |
| 2000 | 342.4 | 255.8 | 287.7 |

in 1965 for the "low" and assuming it to be delayed until 1980 for the "high". Mortality trends for these variants are the same as those assumed for the "medium" variant.

According to the "medium" projection, the regional population would increase at a slightly rising rate during the 1960's, with a perceptible slow-down appearing in the latter part of the 1970's, when the decline of fertility in India and Pakistan, assumed to have begun in 1970, would come to outweigh the assumed continuing decline of death rates in these two countries.

The decennial population increases for the region as a whole would be 27.2 per cent in the 1960's, 27.7 per cent in the 1970's and 23.4 per cent in the 1980's, as compared with 22.6 per cent in the 1950's and much smaller percentages in earlier periods. In other words, the anticipated decline in mortality would keep population growing rapidly for at least two more decades if fertility decline should begin in 1965.

The longer-range projections suggest that population is likely at least to double by the end of the century even though a substantial fertility decline should commence immediately ("low" variant).

B. SOUTH-EAST ASIA

1. Population growth, 1920-1960

The population of this region is well documented with censuses, some of them taken periodically, others less frequently. New census results dating back no further than 1957 are available for all areas except the Republic of Viet-Nam, Burma, and Laos. In Burma, a long series of decennial censuses has been discontinued since 1941. In former French Indo-China, administrative counts were carried out repeatedly from which population estimates were derived, but not with the accuracy of a modern census. The results of censuses taken in 1959 in Cambodia and in 1960 in North Viet-Nam suggest that previous

population estimates may have been too low, whereas the 1961 census of Indonesia confirmed that recent population estimates for that country, where no census had been taken since 1930, were not far short of the facts. Burma, Laos and possibly the Republic of Viet-Nam are countries for which current population estimates do not rest on a secure basis.

In all the major countries of the region, vital statistics registers are maintained but the registration is of doubtful accuracy or incomplete except in Malaya²² and Singapore. Data on age composition of population from censuses and surveys are the major basis for the estimation of levels of fertility and mortality for most countries of the region. Registration is believed to be approaching completeness in some provinces of certain countries, e.g., Indonesia and the Republic of Viet-Nam, while in other provinces the reporting of births and deaths is patently incomplete.

The population estimates for 1920 to 1960 shown in table A3.8 were taken from official sources where available, others being derived by interpolation and extrapolation from available official data. Data for Indonesia include for all dates the population of West Irian (western part of the island of New Guinea for which administrative responsibility was transferred to Indonesia on 1 May 1963). For Burma, official population estimates depend on extrapolation of the series of censuses ending in 1941; the results of a projection were used for dates after 1950.²³ For Thailand, an estimate was made for 1950, taking account of probable omissions of census enumeration in 1947 and 1960.²⁴

These estimates generally imply a fairly high rate of population increase for the 1920's and an even higher rate in the 1930's, followed by slower growth in the 1940's associated no doubt with the hardships of war. In the 1950's, population grew at a greatly accelerated pace.

In the 40-year period, 1920-1960, it is estimated that the regional population doubled. This growth was unequally distributed among the countries. Very rapid growth in the small areas of Singapore and Brunei is largely attributable to migration. Migration also contributed considerably to population growth in Malaya, particularly in the 1920's. Large countries with very high rates of population growth due mostly to natural increase are the Philippines and Thailand, whereas in Indonesia population grew at a more moderate rate. As already mentioned, the data on the population trends in Burma, Laos, and the Republic of Viet-Nam and North Viet-Nam are not very reliable, and the same caution applies to the estimates of the growth rates in Cambodia prior to the most recent years.

2. Fertility

The only countries in the region where birth rates are reliably recorded are Malaya and Singapore. In Malaya,

²² Now part of Malaysia.

²³ Census Department, Government of Burma, *Population Projections for Burma* (1961-1975), (29 July 1963). (Projection for 1961 adjusted to 1960).

²⁴ Ajit Das Gupta *et al.*, "Population Perspective of Thailand" (Bangkok, 1963) (mimeographed).

the recorded rates averaged 44.1 per 1,000 during 1950-1954 and 44.4 during 1955-1959, with a slight decrease to 40.9 in 1960 and 41.9 in 1961. While this may be merely a temporary fluctuation, its possible significance for the future trend is indicated by a more marked recent decrease in the birth rate of Singapore: here, rates of 45 to 46 per 1,000 were recorded in years up to 1954, falling to 40.3 in 1959, 38.7 in 1960, 36.5 in 1961, and 34.1 in 1962.

In large parts of the Republic of Viet-Nam, birth registration in the past had been fairly satisfactory over a long period, but decreasing numbers of births were recorded in the areas of presumably most reliable registration during 1959-1961. While registration may have deteriorated during those years, the decreases are spread fairly evenly among the several provinces. This observation, together with the comparatively high average age of women at marriage recorded in the vital statistics, suggests that fertility might have declined, though it must be admitted that this interpretation of the available data is not certain. There are available data to indicate the fertility trend in North Viet-Nam.

For other areas in the region, birth rates have been mostly estimated from census or survey data on age composition. Rates of about 50 per 1,000 or slightly higher have been calculated for Cambodia, Indonesia, areas in Sabah (formerly North Borneo), and the Philippines, and rates markedly above 45 per 1,000 for Thailand and North Viet-Nam, though the basis in the latter case is rather uncertain. In Burma, the birth rate does not seem to have exceeded 40 per 1,000 by much. But the rates determined for different periods of the past two decades do not reflect fertility in comparable fashion because of recent modifications in age structure. There is evidence to show that birth rates were temporarily much reduced in some of these countries during the period of military occupation in the early 1940's. The data on age composition suggest temporary variations but no general trend in fertility levels over a long past period, and evidence is lacking whether there has been any recent modification though crude birth rates may have been affected by the war-time effects on age composition.

3. Mortality

Sharp reductions in death rates are shown by the relatively accurate registration data for Malaya and Singapore. Previously much higher, the death rate in Malaya fell to 14.0 per 1,000 in 1950-1954, 11.3 in 1955-1959, and only 9.5 per 1,000 in 1960. In Singapore, where the death rate likewise used to be in excess of 20 per 1,000, the decline has been even greater and a rate as low as 5.9 per 1,000 was recorded in 1962. In Singapore, however, the age composition which has resulted from past immigration is favourable to a low death rate, the proportion of aged persons still being comparatively small. From the registration data, an expectation of life at birth of 57 years has been calculated for Malaya in 1956-1958; while this may be a slight over-estimate, in view of possible omission of some deaths, it is possible that more recently such an expectation of life has in fact been attained, if not surpassed. In Singapore, expectation of life probably surpassed 60 years by a considerable margin in 1960.

Analytic estimates based on age composition and intercensal increases of population indicate that an expectation of life of 50 years was attained and probably surpassed during the 1950's in the Philippines and in Thailand.²⁵ A survey carried out in Cambodia in 1958 resulted in an estimate of 44 years for the expectation of life. For other countries of the region, reliable estimates of the level of mortality are not easily obtained.

For a previous set of United Nations population projections,²⁶ it was assumed that the expectation of life in 1960 was nearly 45 years in Indonesia and possibly in Burma, and nearly 55 years in Malaya. Although the basis for these assumptions was slender, the general orders of magnitude may have been approximately correct since the results of the projections, on the whole, did not differ widely from the population figures shown by recent censuses.

In the region as a whole, average expectation of life at birth was probably between 45 and 50 years in 1960.

4. Migration

Small areas such as Singapore and Brunei may experience migration in future decades on a scale that would affect the rate of population growth considerably, and there is also the possibility of some migration into Sabah and Sarawak.

In earlier decades, the regional population was significantly augmented by the immigration of Chinese, and also of Indian and Pakistani, labourers but more recently interregional movement has been on a small scale and comparatively insignificant in proportion to the indigenous population. Interregional migration is no longer likely to contribute appreciably to the growth of total population in the region.

5. Projections for countries, 1960-1980

Among recent population projections available at the time of preparation of the present report for countries of South-East Asia were semi-official or unofficial projections for Java, Thailand, Sarawak, Sabah and Brunei,²⁷ and official projections for the Philippines, Burma, Malaya and Singapore, prepared by the national statistical services.²⁸ For the purposes of this study, use was made of

²⁵ Bureau of the Census and Statistics, Government of the Philippines "Population projections for the Philippines, 1960-1975" (Manila, 1963) (mimeographed); and H. Gille and T. Chalothorn, "The Demographic Outlook of Thailand and Some Implications" (revised and corrected version of a paper presented to the National Seminar on the Population of Thailand, Bangkok, March 1963, manuscript dated November 1963).

²⁶ *The Population of South-East Asia (including Ceylon and China (Taiwan)), 1950-1980* (United Nations publication, Sales No.: 59.XIII.2.).

²⁷ Hilda Wander, *Trends and Characteristics of Population Growth in Indonesia*, an interim report, United Nations Technical Assistance Operations, Djakarta, July 1959. The report also contains future estimates for the remainder of Indonesia according to estimated rates of increase; the dates for the projection proceed by 5-year intervals from the year 1957, which was found inconvenient for the present purpose. Ajit Das Gupta *et al.* "Population Perspective of Thailand", *op. cit.*; also H. Gille and T. Chalothorn, "The Demographic Outlook of Thailand and some Implications" *op. cit.* Projections supplied by L. W. Jones, former Superintendent of Census for Sarawak and North Borneo and Census Advisor, Brunei, with assumptions diversified by major ethnic groups in each of the three territories.

²⁸ Bureau of the Census and Statistics, Government of the Philippines, "Population Projections for the Philippines, 1960-1975" (supplied to the

the projections for the Philippines (constant fertility, medium mortality decline), Thailand (fertility decline with moderate mortality decline), Burma (constant fertility and declining mortality), Sarawak, Sabah and Brunei (allowing for fertility decline of the Chinese minority in the last three instances), as these were calculated for dates coinciding with those of the present report. For other countries in the region, earlier United Nations projections were used.²⁹ All the projections were pro-rated so as to coincide with population estimates for mid-year 1960.

These projections for individual countries were used as a basis for the "medium" variant up to 1980. Up to that year, for lack of other indications, fertility was assumed to remain constant in all areas of the region except the Republic of Viet-Nam, North Viet-Nam, Thailand, Malaya, Singapore, and the Chinese minorities of Sarawak, Sabah, and Brunei.

The selected projections for individual countries up to 1980 are brought together in table A3.8. In selecting projections where a set of alternatives was provided, an arbitrary choice sometimes had to be made, and it is not certain that the figures shown for each country represent strictly comparable prospects. It can be questioned, for instance, whether, fertility is as likely to remain constant up to 1980 in the Philippines as it is to decrease from 1965 onward in Thailand. It is possible that fertility may decrease significantly in both countries, beginning at some date between 1965 and 1980. The selection was guided mainly by the manner of presentation of variants by the authors of the projections.

The selected projections suggest diminishing rates of population growth in the Republic of Viet-Nam, North Viet-Nam and Thailand, fluctuating rates in Malaysia, and steadily increasing rates in the remaining countries. They suggest that, over the twenty-year period, the population of the Philippines would double, that of Thailand, Malaysia and Cambodia would increase by at least three-quarters, and that of the remaining countries by at least one-half. The sum of projections for individual countries differs only slightly from the "medium" projection for the entire region, described in the next section.

6. Variant and long-range projections

The question of comparability of population projections for different countries of the region takes an added importance in consideration of prospects over a longer period

Statistical Office of the United Nations; assumption of constant fertility and declining mortality). Census Department, Government of Burma, *Population Projections for Burma (1961-1975)*, July 1963. Department of Statistics, Federation of Malaya, *Paper A. Population*, Government of Singapore, "Singapore: Country Statement" (paper submitted at the United Nations Asian Population Conference, New Delhi, December 1963). The projections for Malaya and Singapore were calculated for five-year intervals from the year 1957, which was found inconvenient for the purpose of this report.

²⁹ *The Population of South-East Asia (including Ceylon and China (Taiwan)), 1950-1980*, *op. cit.* The following projections were selected: The Republic of Viet-Nam and North Viet-Nam: rapid mortality decline; fertility assumption modified to represent onset of fertility decline as of 1960, the decline accelerating according to the generalized assumption made in this report; Malaya: rapid mortality decline, moderate fertility decline, and emigration; Singapore: rapid mortality decline, rapid fertility decline, and immigration; Cambodia, Laos and Portuguese Timor: "conservative" projections. For Indonesia, an average was taken of two projections, one with rapid mortality decline, the other with a "conservative" rate of mortality decline.

of time in the future. It is difficult to maintain comparability of assumptions in a region where there is such diversity of cultural traditions, geography, and levels of economic and social development. Fertility has recently been declining in Singapore, to a lesser extent in Malaya, and possibly also in the Republic of Viet-Nam and North Viet-Nam. Some of the Governments have expressed an interest in action programmes designed to disseminate knowledge and means of family limitation, while others have not. Yet rapid population increase, growth of cities, intensification of trade, advances in popular education, reductions of mortality, and other economic and social gains are common to the entire region and these developments may exert pressure toward reduction of fertility in every country in the future. A drop in the birth rate therefore seems likely to occur sooner or later in all countries in the region but it is not possible to foresee at what time such a change will occur in each country.

In view of the evidence of recent declines of fertility in some of the countries, 1960 was taken as the date of onset of a decline of fertility in the region as a whole for the purpose of the projections. However, the time-period assumed for a halving of the regional average birth rate was varied according to the type of assumption made.

It was estimated that the regional average expectation of life at birth amounted to 47.5 years in 1960, the gross reproduction rate to 3.0, and the sex-age adjusted birth rate to 44.68 per 1,000. The sex-age composition of the regional population as of 1960 was estimated by summing data from available projections and pro-rating them so as to coincide with the estimated regional total.

In view of the rapid progress in reduction of mortality in much of this region in recent years, a rise in expectation of life to 50 years within the 1960-1965 period was assumed, followed by further rises in accordance with the generalized assumptions, so that the expectation of 68.2 years would be reached in 1995-2000. Putting the 1960 level of fertility as equal to 100, and assuming it to be halved within 45, 60, or 80 years, the following relative levels of the sex-age adjusted birth rate were obtained for the "high", "low" and "medium" variants:

| Period | "High" variant | "Low" variant | "Medium" variant |
|---------------------|----------------|---------------|------------------|
| 1960 | 100.0 | 100.0 | 100.0 |
| 1960-1965 | 99.5 | 98.0 | 99.0 |
| 1965-1970 | 98.5 | 95.0 | 97.5 |
| 1970-1975 | 97.0 | 90.0 | 94.0 |
| 1975-1980 | 95.0 | 84.0 | 90.0 |
| 1980-1985 | 92.0 | 77.0 | 85.0 |
| 1985-1990 | 88.0 | 70.0 | 80.0 |
| 1990-1995 | 84.0 | 63.0 | 75.0 |
| 1995-2000 | 80.0 | 57.0 | 70.0 |

The assumptions applied to a model constructed for the regional population resulted in variant projections as shown in annex 3, tables A3.2 to A3.4. For the region as a whole, the increase in twenty years would be by two-thirds according to the "medium" variant. Despite fertility declines anticipated in several countries, the total population of the region would grow without loss of momentum;

indeed, the rate of growth would rise in the decade of the 1980's. This accelerating trend would result from changes in age composition caused by the temporary reduction and subsequent recovery of birth rates in the course of the 1940's, probably due to the war and its after-effects.

In the longer-range view of the future, the figures suggest that as much as a tripling of the regional population by the end of the century can occur even if fertility decline has already begun and gradually spreads into various parts of the region. Growth faster than in the 1950's would continue to the end of the century, except on the "low" variant, which assumes simultaneous fertility decline in all parts of the region within the near future. A slow-down or only moderate acceleration of growth in the 1970's would be caused partly by the changing age composition of the population, which was affected by a deficit in births (or excess in child mortality) owing to war conditions in the early 1940's.

C. SOUTH-WEST ASIA

A number of problems are encountered in the preparation of population estimates and projections for countries in this region. Demographic conditions in the several countries differ considerably, but gaps and inadequacies in the statistical documentation make it difficult to measure the extent of such differences. For some countries in the region, the estimates are rough conjectures at best. Despite the unreliability of estimates for some countries, however, there is a likelihood that errors tend to be partly compensated in the regional sums; in this sense, more reliance can be placed on estimates of population growth in the region as a whole than in each country.

1. Population growth, 1920-1960

Modern censuses were taken in Turkey in 1927 and every five years since 1935. Censuses have also been taken repeatedly in Israel and Jordan (if we include those taken in 1922 and 1931 in the former Territory of Palestine), and in Aden, Bahrain and Cyprus. The censuses of Iraq in 1947 and 1957 and those of Kuwait in 1957 and 1961 showed a surprisingly high rate of population growth which indicated a need for the re-examination of earlier population estimates for these and other countries. A census was also taken in Syria in 1960. For Syria and Lebanon, earlier population estimates are supported to some extent by administrative counts made in the 1920's and 1930's though these presumably were not as accurate as modern censuses, and by the annual registration of births and deaths, though this is known to be incomplete. No modern census has been taken in Saudi Arabia, Yemen, the Protectorate of Southern Arabia, and Muscat and Oman. Even the current population estimates for these areas are largely conjectural, though there have been administrative counts of the population of Yemen, and some sample surveys in Saudi Arabia.

Most countries in the region once belonged to the Turkish Empire and administrative counts of the population were made upon occasion under that rule, but the methods were not uniform and the results were rarely published. About the end of the last century and near the beginning of the present one, several scholars compiled the popu-

lation estimates then available for those areas, making such adjustments as the gaps in the data seemed to require. One such compilation, summarizing the findings of several studies on the subject,³⁰ was taken into account for the purpose of calculating population estimates since 1920, although the early estimates are far from reliable and the series for particular countries are mostly conjectural. According to these indications, the population in the present area of Turkey seems to have increased comparatively slowly in the early decades of this century while population growth in Iraq, Syria, Lebanon and Jordan appears to have been much more rapid; in the Arabian peninsula, an intermediate rate of increase seems to have prevailed. Admittedly, a large part of these apparent differences might be due to the defects of the data.

The population increases during 1920-1960 implied in these estimates are summarized by groups of countries in annex 3, table A3.9 Some of the increases are due partly to large transfers of population. In spite of the uncertainty of the conjectures that had to be made, it is safe to conclude that population growth has recently accelerated in most of the region. The acceleration seems to have been especially great in Turkey, and before the decade of the 1950's the population at least in the group of Northern Arab countries seems to have been growing considerably more rapidly than in Turkey.³¹ The extraordinary population growth in Israel resulted mostly from immigration except in the 1940's, when immigration was largely balanced by an out-movement of refugees. In Cyprus, on the other hand, population has grown moderately and at a decreased rate in recent years. In the forty-year period, according to these estimates, the population of the Northern Arab countries nearly tripled, that of Turkey doubled, and that of the Southern Arab countries increased by about three-quarters. Within the boundaries of Israel, the number of inhabitants more than quadrupled. Migration has been a large factor in these unequal rates of growth, and the rates of fertility and mortality have also differed widely.

2. Fertility

The only countries in the region with reliable vital statistics registration are Cyprus (up to 1955) and Israel and neither of them is representative of any large part of the regional population. Vital statistics are also recorded in Iraq, Jordan, Lebanon, Syria and Aden but, except for recent years in Aden, with incomplete or varying coverage.

In Cyprus, the registered birth rate was 31.8 per 1,000 in 1935-1939, and 31.2 in 1945-1949; it declined to 27.9 in 1950-1954. The estimated rate was 26.2 in 1955-1959 and 24.8 in 1962.

In Israel, the birth rate of the Jewish population generally fluctuated between 25 and 30 per 1,000 in the 1930's and 1940's, rose to 32.5 per 1,000 in 1950-1954, but subsided to 27.9 in 1955-1959 and 25.8 during 1960-1962. Migration has introduced modifications in age composition which favoured a high birth rate, an effect that tends

to wear off as time passes. In addition, there has been a gradual reduction in the gross reproduction rate which makes it appear probable that the birth rate will decrease further in the future.

For Turkey and Iraq, it was possible to calculate approximate birth rates by the "reverse-survival" method from census age data, but not reliably in view of inaccuracies in age reporting. The birth rate of Turkey appears recently to have been near 40 per 1,000³² possibly slightly less, while that in Iraq is estimated at approximately 48 per 1,000. In the absence of data on the birth rates in Syria, Lebanon and Jordan, it was assumed for the present purpose that they were near the rate of Iraq whereas in the Arabian peninsula, where population has grown less rapidly, if the dubious estimates for the period since 1920 can be taken as an indication, the average birth rate may be lower.³³ For the region as a whole, the average birth rate was estimated between 40 and 45 per 1,000.

3. Mortality

The death rate in Cyprus shows a continuous decrease. From 18.9 per 1,000 in 1921-1924, it fell to 12.6 by 1940-1944, 8.8 by 1945-1949, 7.7 in 1950-1954, and to estimated rates of 6.2 in 1955-1959, and 5.9 in 1962. While the youthful age composition favours an unusually low death rate, an expectation of life seems to have been reached which does not compare unfavourably with that of countries in Southern Europe.

For the Jewish population of Israel, the data show a very high expectation of life, rising from about 68 years (both sexes) in 1950 to about 72 years by 1960. The death rate during the 1950's fluctuated mostly between 6 and 7 per 1,000, a rate of only 5.7 being registered in 1960. The effects of migration on the age composition favour a low crude death rate. As a considerable further gain in expectation of life is not likely in the foreseeable future and the proportion of elderly people in the population will rise, significant decreases in the death rate are no longer probable and a gradual rise is eventually to be expected, even if the excellent public health conditions are further improved.

Again, the two countries with reliable statistics are unrepresentative of conditions in the region. For other countries, the approximate level of mortality can only be conjectured from estimated differences between rates of population growth and birth rates, and as the latter rates are estimated unreliably, the possible error in the estimated differences is even greater. There is little substance in such conjectures except as a check on the consistency of estimates with each other and with what is known of the death rates in other countries where health conditions are thought to be similar. On the whole, it appears that expectations of life of the order of 50 years have been reached if not surpassed in Turkey, Iraq, Syria and Lebanon. On the other hand, in much of the Arabian peninsula, expectation of life may be below 40 years and possibly little more than 30 years.

³² But lower in 1940-1945, when war-time mobilization separated many husbands from their wives.

³³ Fertility of Arabs living in villages was found to be about 20 per cent higher than that of nomads in a study of data obtained in pre-partition Palestine. H. V. Muhsam, "Fertility and Reproduction of the Beduin", *Population Studies*, vol. IV, No. 4 (March 1951) (London), pp. 354-363.

³⁰ A. Supan, *Die Bevölkerung der Erde*, (Ergänzungsheft Nr. 135, Petermanns Geographische Mitteilungen) (Gotha, Justus Perthes, 1901). Supan based his data largely on research done by Cuinot, Holtzmann and Moysse.

³¹ The validity of the difference between estimated rates of growth for the Northern and Southern Arab countries is more dubious.

4. Migration

Except for the Palestinian refugees who left the present area of Israel before and around 1950, and movements to small areas where there has been a development of the oil industry and entrepôt trade (e.g., Kuwait, Aden and Bahrain), there does not appear to have been much migration between countries of the region.

Immigration to Israel was on a particularly large scale around 1950 but was reduced more recently to a much smaller stream. Most of the migrants originated outside the region though some, particularly during the 1950's, came from countries within the region, e.g., Iraq and Yemen. The prospect for further migration to Israel cannot be easily assessed as it depends in part on the conditions of Jewish minorities in numerous other countries. So far as can be judged by present indications, future immigration to Israel may remain on a comparatively small scale.

There has been some emigration to other parts of the world from Cyprus, Syria and Lebanon and, in recent years, a migration of Turkish workers to Western Europe. There are few statistics to estimate the size and trend of these movements, and they do not seem likely to attain a large scale.

5. Projections for countries, 1960-1980

Population projected were available only for Turkey and Israel among the countries in this region. A projection for Greece³¹ was used for the purpose of projecting the rate of population growth in Cyprus.

The projection for Turkey³² had been calculated on the assumption that expectation of life would attain 57.6 years in 1960-1965, with further increases in successive future periods, and that the birth rate in 1960 was near 40 per 1,000. For the present purpose, the projection was modified by substituting different numbers of surviving children to be born on the assumption that fertility would begin to decline either in 1965, 1970 or 1980, in accordance with the generalized assumption regarding the duration and extent of the decline. The three alternative dates for onset of decline were selected in view of the provision in the new Five-Year Plan for extensive activities to assist Turkish citizens in limiting their families. The proximity of Turkey to countries of Europe where fertility is now low is also pertinent. Thus 1980 may be regarded as a relatively late date for the onset of a general decrease of fertility in Turkey.

The projection for Israel, which extended only to 1970, had been calculated with varying assumptions as to the future volume of net immigration.³³ At the time of its calculation, the country had received much immigration from other areas of South-West Asia and North Africa, which has since then been greatly reduced in volume. Accordingly, the assumption of a relatively small net immigration (20,000 per year) appeared more relevant in the present circumstances. The projection on this basis

shows a gradually diminishing rate of population growth. In view of the difficulty of foreseeing future migration and the possible variations in the average fertility of a population of such diverse origins, the projection was extended beyond 1970 on the simple assumption that the rate of population growth would continue diminishing at the same pace. This may occur as a result of a gradually decreasing birth rate, a gradually diminishing inward migratory balance, or a combination of such conditions.

The projections for Turkey, Israel and Cyprus were pro-rated to coincide with the population estimate available for 1960. The "medium" or most likely assumption, in the case of Turkey, was that of a fertility decline beginning in 1970; the date of onset was put at 1965 for the "low" and 1980 for the "high" assumption. For Iraq, Syria, Lebanon, Jordan, and the larger countries of the Arabian peninsula, because of the heterogeneity of demographic conditions, projections were calculated with the use of theoretical population models, the levels of fertility and mortality being conjectured rather freely but in such a way as to be consistent with available population estimates. The calculation required the formulation of specific assumptions regarding fertility and mortality rates, which admittedly do not have much foundation.³⁷ For smaller countries of the region, future population estimates were extrapolated in cruder fashion by approximately constant rates or amounts of increase. The results of these projections and extrapolations are brought together in table A3.8. Rates of population increase are shown for groups of countries. The projections for Turkey show that, in view of changes in age composition, fertility decline as assumed would result in a nearly constant rate of increase.

6. Variant and long-range projections

Because of the heterogeneity of demographic conditions in this region, variant population projections had to be calculated separately for different groups composing the regional population. The "high", "low", and "medium" variants were calculated with different assumptions for each group of areas as to the dates when fertility would enter into a decline. The projections for Israel and Cyprus were extended to the end of the century without variants since changes of trends in these two countries are unlikely to have a large effect on the regional total population.

The details of the conjectures are too questionable to have much validity as regard the population projections for each group of countries; hence, the results are not reproduced in such detail, only the resulting totals are shown in tables A3.2 to A3.4. Nearly a tripling of the population from 1960 to 2000 can be expected even though a decline of fertility should occur in Turkey in the near future.

³¹ According to "medium" assumption of projections for Greece published in *Demographikai Exelixeis en Elladi, 1950-1980* (Athens, 1962).

³² State Planning Organization, Republic of Turkey, *First Five-Year Development Plan, 1963-1967* (Ankara, December 1962) (English draft).

³³ Benjamin Gil, *Projections of the Population of Israel, 1955-1970* (Jerusalem, Central Bureau of Statistics, 1958).

³⁷ In Syria, Iraq, Lebanon and Jordan, expectation of life in 1960 was assumed to be 50.0 years for the "high" and "medium" variants and 47.5 for the "low" variant, and the gross reproduction rate was assumed to be 3.4 (2.7 in Lebanon and 3.5 in the other countries). For the Arabian Peninsula, expectation of life in 1960 was assumed to be 35.0 years and the gross reproduction rate 3.0. On the "medium" assumption, the onset of fertility decline was supposed to occur in the group of Northern Arab countries in 1980, but not in the present century in the group of Southern Arab countries. For the "high" variant, the date of onset of fertility decline was taken to be 1990 in the Northern Arab countries. For the "low" variant, fertility was assumed to decline from 1970 in the Northern Arab countries, and from 1985 onward in the Southern Arab countries. These assumptions, however, have little foundation in known facts.

Chapter 12

EUROPE

A. GENERAL BASIS OF PROJECTIONS FOR EUROPE

The major area designated as Europe in this report comprises all European countries outside the Soviet Union and Turkey. With few exceptions, the statistical record of recent population trends is very good in all countries of this area. Difficulties arise in constructing historical estimates for countries which have had their boundaries changed, and there were some losses of vital statistics records during the Second World War. Migratory balances cannot be calculated accurately, as the definitions, quality and coverage of migration statistics vary considerably among countries.

The repeated calculation of detailed population projections has become an established practice in the major countries of Europe, and the calculations for the present purpose could be based to a large extent on published national projections. The population projections assembled for a majority of European countries by the Organization for European Economic Co-operation provided a substantial body of data;¹ for other countries, the most recent available national projections were used.² These data form the basis of the medium future estimates for the period 1960 to 1980. Many of these projections were calculated in refined form; but in the light of latest data, some relatively crude adaptations and extensions had to be applied to them.³

During recent decades, the trends of fertility and mortality in regions and countries of Europe have converged

considerably and no obvious reasons now appear for expecting any new divergence in the future. Disregarding migration (which is discussed further on), the differences in rates of population growth are now as much due to the differences in age composition—a result of varied population trends in the past—as to whatever differences still remain in levels of specific fertility and mortality rates. There is nothing in present indications to suggest that population is likely to grow at very different rates in the long run in different parts of Europe, though the possibility of such differences is not excluded. The long-term projection for each region were therefore based on closely similar assumptions, which are summarized below.

For each variant of the long-range projections, it was assumed that mortality would decline so that the expectation of life would rise from its estimated level for 1960 to 73.9 years, with no further rise thereafter. This is not necessarily a limit that cannot be surpassed but, as explained in chapter 9, it was taken as the highest value to be reached in any region for the purpose of the projections in this report. Estimated at about 71 years in 1960 in Northern Europe, 70 years in Western Europe, 68 years in Eastern Europe and 67 years in Southern Europe, life expectancy was assumed to reach the level of 73.9 years by 1970, 1975, 1980 and 1985, respectively, in these four regions.

Some variations were allowed in the assumptions as to future fertility trends for the different regions of Europe, and additional assumptions were introduced regarding net migration. The migration assumptions differed in the "high", "low" and "medium" variants for each region, but only an assumption of "moderate" migration was retained for interregional comparisons. On every assumption, the migratory balances (inward or outward) were assumed to continue at a constant level from 1960 to 1980 and thereafter to diminish progressively so as to vanish by the end of the century.

Whereas, in the sections dealing with each region (except Eastern Europe), varied results are shown corresponding to varying assumptions as to the annual volume of migration, particular migration assumptions were selected for the world-wide comparisons made elsewhere in this report with a view to obtaining a balance of migration assumptions between Europe and other parts of the world. For 1960-1980, the selected migration assumptions are: a net annual inward balance of 100,000 in Western Europe, and outward balances of 225,000 in Southern Europe, 7,500 in Eastern Europe, and 97,500 in Northern Europe. "Medium" projections for the regions up to 1980 (in table A3.2) correspond to these selected migration assumptions. The selected assumptions agree with those made in

¹ Organization for European Economic Co-operation, *Demographic Trends in Western Europe and the United States, 1956-1976* (1961). This set includes projections for Austria, Belgium, Denmark, France, the Federal Republic of Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

² Bulgaria: *Statistika* VII (3), 1960; Czechoslovakia: *Perspektiva vývoje obyvatelstva v letech 1960-1980*; Pořadové číslo: 4, V Praze dne 4. února 1963; Eastern Germany: *Statistische Praxis* XVII (9), 1962 (Beilage); Finland: *Tilastokatsauksia* XXXVIII (1), 1963; Greece: *Demographikai Exeliseis en Elladi 1950-1980*, Athens, 1962; Hungary: projection supplied to this office in 1961 by the Central Statistical Office of Hungary; Malta and Gozo: *Demographic Review of Maltese Islands for the Year 1959*, Valetta, 1960; Poland: *Gospodarka Planowa* XVI (8-9), 1961; Romania: *Revista de Statistika*, 5-6, 1960; Yugoslavia: *Stanovništvo* I (1), 1963.

³ All figures were pro-rated so as to coincide with the estimate of total population for mid-year 1960 (many of the projections had originally been calculated for dates such as 1 January 1961, 1 January 1966 etc.; these were pro-rated and used for the present purpose as though the dates had been mid-year 1960, 1965 etc.). A majority of the national projections terminated in 1975 (or 1 January 1976); to obtain a corresponding estimate for 1980, an extrapolation was made on the assumption that the increase in absolute numbers during 1975-1980 would equal one third of the absolute increase calculated for 1960-1975. A second pro-rating was applied to the series for 1965-1980 so obtained to take into account the latest current population estimates available for mid-year 1962. Because of the loss of accuracy caused by these methods of adjustment and extension, the nearest rounded figures were substituted within one per thousand of the estimated total (within two per thousand for 1980).

national projections in Western Europe, but they imply more net emigration in Southern, Eastern and Northern Europe than was assumed in the national projections.⁴

The alternative fertility assumptions of the long-range projections were drawn up identically for all four regions. On the "high" assumption, the sex-age adjusted birth rate rises (or falls in the case of Northern Europe) to 20.0 per 1,000 by 1970; on the "medium" assumption, it drops to approximately 18.0⁵ and on the "low" assumption, to only 16.0 per 1,000 in each region. The 1970 level was maintained constant for each variant to the end of the century. The detailed observations suggest that such future levels are equally plausible for the four regions. Sex-age adjusted birth rates of 16.0 and 20.0 correspond roughly to gross reproduction rates of 1.0 and 1.25, respectively.⁶

The "medium" variants of the regional projections differ somewhat from the sums of the estimates compiled from projections for each country up to 1980, not only because of the difference in migration assumptions already mentioned, but also because some of the national projections had been drawn up a number of years earlier, and in the meantime mortality had declined more than foreseen in several instances. The trend of migration also had been somewhat different from what had been expected in some cases. Hence, no effort was made here to force the sum of the country estimates into balance with the "medium" variant for each region.

⁴ The aggregate of the available national projections suggested annual net immigration for 1960-1980 of 100,000 in Western Europe, and emigration of 150,000 and 65,000 in Southern and Northern Europe, respectively, leaving an outward balance of 115,000 for Europe as a whole. In view of nearly four times as much immigration being implied in the national population projections of Northern America and Oceania, and considering also the likelihood of some European migration to Latin America, somewhat larger emigration from both Southern and Northern Europe was assumed for the regional projections.

⁵ Actually, the "medium" projection was calculated as a simple average between the "high" and "low" variants, which seems well indicated by a comparison with national projections.

⁶ The sums of national projections agree closely with the "medium" assumption for each region, where the sex-age adjusted birth-rate was placed near 18 per 1,000. The extent to which the "medium" projections for Southern and Northern Europe fall below the corresponding sums of national projections is mostly accounted for by the different amounts of emigration assumed.

B. WESTERN EUROPE

1. Population growth, 1920-1960

Tables A3.8 and A3.9 in annex 3 show population changes from 1920 to 1960 in the Western group of European countries. It is difficult to reconstruct the trend of population within the present frontiers of the Federal Republic of Germany very accurately; though population figures for the area within present boundaries were available for earlier census dates, the estimates for 1920, 1930 and 1940 had to be interpolated. The estimates for West Berlin at those dates are roughly two-thirds of the reported combined population of Berlin. It is believed that the resulting errors are not large.

The total population of the Western European countries grew with moderate speed in the 1920's, slowly in the 1930's, and more rapidly in the 1940's and 1950's, but this pattern results from partly divergent national trends. France, after two decades of almost negligible population growth, has experienced appreciable growth since the Second World War. There was no slow-down in the Federal Republic of Germany in the rate of growth measured by decades, and recently the Federal Republic gained much population as a result of post-war transfers and subsequent migration across the Eastern boundary. Considerable population growth occurred in the Netherlands throughout the four decades. Slow-down of growth in the 1930's was recorded both in Belgium and Austria; the recent acceleration was very slight in Austria, moderate in Belgium, but considerable in Switzerland. Berlin's population was partly evacuated between 1942 and 1944, when the city was attacked by air and land; owing to the partition of Germany, its population has not regained the previous size and in recent years, it has been diminishing.

In the forty-year period, the total population of Western Europe increased by 33 per cent. The increase was 68 per cent in the Netherlands, about 50 per cent within the area of the Federal Republic of Germany, 38 per cent in Switzerland, 21 per cent in Belgium, 18 per cent in France, and 10 per cent in Austria. These differences are due in part to variations in fertility (e.g., comparatively high birth rates in the Netherlands; low birth rates in the 1930's

TABLE 12.1
Crude birth rates in Western Europe, 1920-1962
(Per 1,000 population)

| Country | 1920-1924 | 1925-1929 | 1930-1934 | 1935-1939 | 1940-1944 | 1945-1949 | 1950-1954 | 1955-1959 | 1960-1962 |
|------------------------------|-----------|-----------|-----------|-----------|-------------------|-------------------|-----------|-----------|-----------|
| Germany: | | | | | | | | | |
| Pre-1938 territory | 23.1 | 19.1 | 16.3 | 19.4 | 17.4 ^a | .. | .. | .. | .. |
| Federal Republic | .. | .. | .. | .. | .. | 16.9 ^b | 16.1 | 16.8 | 17.3 |
| West Berlin | .. | .. | .. | .. | .. | 9.0 ^b | 8.7 | 8.3 | 10.9 |
| France | 19.9 | 18.5 | 17.3 | 15.1 | 16.3 | 20.3 | 19.5 | 18.4 | 18.0 |
| Netherlands | 26.7 | 23.4 | 21.7 | 20.3 | 21.8 | 25.9 | 22.1 | 21.2 | 20.9 |
| Belgium | 21.1 | 18.9 | 17.6 | 15.5 | 13.8 | 17.3 | 16.7 | 17.0 | 16.9 |
| Austria | 22.6 | 18.4 | 15.1 | 14.7 | 19.1 | 16.7 | 15.0 | 16.8 | 18.3 |
| Switzerland | 20.0 | 17.8 | 16.7 | 15.4 | 17.9 | 19.4 | 17.3 | 17.5 | 18.1 |
| Weighted average | 21.1 | 19.1 | 17.1 | 17.3 | 17.2 | 18.8 | 17.6 | 17.6 | 17.8 |

^a 1940-1943.

^b 1946-1949.

TABLE 12.2
Gross reproduction rates in Western Europe, 1920-1960

| Country | 1920-1924 | 1935-1939 | 1950-1954 | 1960 |
|------------------------------|-------------------|-------------------|-----------|-------------------|
| Germany: | | | | |
| Pre-1938 territory | 1.14 ^a | 1.09 ^b | .. | .. |
| Federal Republic | .. | .. | 0.93 | 1.18 |
| France | 1.21 | 1.02 | 1.34 | 1.33 |
| Netherlands | 1.74 ^c | 1.26 ^d | 1.49 | 1.52 |
| Belgium | 1.20 | 1.01 ^e | 1.13 | 1.23 |
| Austria | 1.01 ^f | 0.80 ^b | 1.00 | 1.29 ^g |
| Switzerland | 1.20 ^c | 0.88 | 1.14 | 1.14 |
| Weighted average | 1.21 | 1.04 | 1.15 | 1.27 |

^a 1923-1927.
^b 1935-1938.
^c 1919-1922.
^d 1936-1939.
^e 1939.
^f 1925-1929.
^g 1959.

in France, Belgium, and Austria) and in part to migration (especially the large population transfer to the Federal Republic of Germany).

2. Fertility

The trends in crude birth rates of countries in the region are shown in table 12.1. The regional average rate declined from 21 per 1,000 in 1920-1924 to 17 in 1930-1944, rose to near 19 in 1945-1949, and more recently fell slightly below 18 per 1,000. Larger changes occurred in the individual countries. In Germany, the rate decreased steeply from 1920-1924 to 1930-1934 and had an early recovery in 1935-1939, which was interrupted by the war, but no post-war recovery like that of other countries appears in the Federal Republic. In France, the birth rate continued decreasing to 15 per 1,000 in 1935-1939, recovered slightly during the war and considerably in 1945-1949, and has subsided slowly since then. In the Nether-

lands, the birth rate paralleled the trend in the region though at a markedly higher level in every period. In Belgium, the rate declined to less than 14 per 1,000 in 1940-1944 and the post-war rise was comparatively slight. In Austria, after a steep decline, the birth rate rose considerably in 1940-1944, but, as in the Federal Republic of Germany, made no immediate post-war recovery. Very low birth rates are recorded in West Berlin.

Because of changes in the age composition of the population, the crude birth rates do not reflect accurately the trends in fertility as related to women of child-bearing ages. The gross reproduction rates assembled in table 12.2 show that fertility has been as high in the region in recent years as it was in the 1920's (then the birth rate was much higher); whereas in the 1930's, when birth rates were little lower than in the recent years, the gross reproduction rate was near unity. Fertility in France and Austria has recently been appreciably higher than in 1920-1924; in the Netherlands it has fallen off by comparison with 1919-1922.

3. Mortality

The trend in the regional crude death rate, as depicted in table 12.3 shows decreases in the 1920's and 1930's, a rise in war-time and the period of post-war hardships, and a lower level in more recent years with little further decline. To an increasing extent, the differences in crude death rates among countries of the region reflect differing proportions of aged persons as a result of earlier changes in the annual number of births. Comparatively high death rates in France and Austria in earlier years indicate that aging of the population was quite advanced even then. While health conditions in the Netherlands are among the best in the world, the particularly low death rate also reflects the effect of higher birth rates and a consequently more youthful population structure. In West Berlin because of aging, the death rate has been rising recently.

According to latest official life tables, expectation of life at birth (both sexes) attained 73 years in the Nether-

TABLE 12.3
Crude death rates in Western Europe, 1920-1962
(Per 1,000 population)

| Country | 1920-1924 | 1925-1929 | 1930-1934 | 1935-1939 | 1940-1944 | 1945-1949 | 1950-1954 | 1955-1959 | 1960-1962 |
|------------------------------|-----------|-----------|-----------|-------------------|-------------------|-------------------|-----------|-----------|-----------|
| Germany: | | | | | | | | | |
| Pre-1938 territory | 13.9 | 11.9 | 11.0 | 11.9 ^a | 12.2 ^b | .. | .. | .. | .. |
| Federal Republic | .. | .. | .. | .. | .. | 17.4 ^c | 11.7 | 11.3 | 11.2 |
| West Berlin | .. | .. | .. | .. | .. | 17.1 | 12.9 | 14.9 | 16.6 |
| France | 17.3 | 17.3 | 15.9 | 15.6 | 17.9 | 13.9 | 12.8 | 11.7 | 11.3 |
| Netherlands | 11.0 | 10.0 | 9.9 | 8.7 | 10.2 ^a | 9.4 | 7.5 | 7.6 | 7.7 |
| Belgium | 13.7 | 13.8 | 13.2 | 13.3 | 15.1 | 13.4 | 12.2 | 11.9 | 12.2 |
| Austria | 16.7 | 14.7 | 13.5 | 13.9 ^a | 14.4 ^a | 15.3 | 12.2 | 12.5 | 12.5 |
| Switzerland | 12.9 | 12.2 | 11.7 | 11.6 | 11.4 | 11.1 | 10.1 | 9.8 | 9.6 |
| Weighted average | 15.1 | 14.2 | 13.1 | 13.2 ^b | 14.4 ^c | 14.9 | 11.8 | 11.3 | 11.1 |

^a Excluding military deaths.

^b Excluding military deaths and civilian war casualty in 1943 (data for 1940-1943).

^c 1946-1949.

^d Excluding deaths of deportees in Germany.

^e Excluding to a varying extent casualty due to war.

TABLE 12.4
Crude rates of natural increase in Western Europe, 1920-1962
(Per 1,000 population)

| Country | 1920-1924 | 1925-1929 | 1930-1934 | 1935-1939 ^a | 1940-1944 ^a | 1945-1949 ^a | 1950-1954 | 1955-1959 | 1960-1962 |
|------------------------------|-----------|-----------|-----------|------------------------|------------------------|------------------------|-----------|-----------|-----------|
| Germany: | | | | | | | | | |
| Pre-1938 territory | 9.2 | 7.2 | 5.3 | (7.4) | (5.2) | .. | .. | .. | .. |
| Federal Republic | .. | .. | .. | .. | .. | (-0.5) | 4.4 | 5.5 | 6.1 |
| West Berlin | .. | .. | .. | .. | .. | (-8.1) | -4.2 | -6.6 | -5.7 |
| France | 2.6 | 1.2 | 1.4 | -0.5 | -1.6 | 6.4 | 6.7 | 6.7 | 6.7 |
| Netherlands | 15.7 | 13.4 | 11.8 | 11.6 | (11.6) | 16.5 | 14.6 | 13.6 | 13.2 |
| Belgium | 7.4 | 5.1 | 4.4 | 2.2 | -1.3 | 3.9 | 4.5 | 5.1 | 4.7 |
| Austria | 5.9 | 3.7 | 1.6 | (0.8) | (4.7) | 1.4 | 2.8 | 4.3 | 4.8 |
| Switzerland | 7.1 | 5.6 | 5.0 | 3.8 | 6.5 | 8.3 | 7.2 | 7.7 | 8.5 |
| Weighted average | 6.0 | 4.9 | 4.0 | (4.1) | (2.8) | (3.9) | 5.8 | 6.5 | 7.0 |

^a Rates in parentheses variously effected by incomplete accounting of wartime deaths and the lack of data for some years (see footnotes to tables 12.1 and 12.3).

lands in 1956-1960, 71 in France in 1961, 69 in the German Federal Republic in 1959-1960 and in Switzerland in 1948-1953, 68 in Austria in 1960; and 65 in Belgium in 1946-1949. Using all available life tables and interpolating and extrapolating the trends, one can estimate the regional average expectation of life as 58 to 59 years around 1930, about 67 years in 1950 and about 70 years in 1960. Further gains are apt to be slow and changes in the population's age composition may cause crude death rates to rise slightly in the near future.

4. Natural increase

As a result of the interplay of fertility, mortality and age composition of the population, rates of natural increase in this region have been mostly moderate or quite low, as shown in table 12.4. For the region as a whole, natural increase dwindled in the 1920's and 1930's and reached a minimum in the 1940's; more recently, it recovered to rates as high or higher than those of the 1920's. An above-average rate of natural increase was maintained consistently in the Netherlands. France and Belgium, on the other hand, experienced net natural decreases around 1940. Recent rates of natural increase exceed those of the 1920's in France and Switzerland, but not in other countries of the region. Because of an unfavourable age composition, the death rate has exceeded the birth rate in West Berlin.

5. Migration

Though migration statistics are maintained in all countries of the region, various definitions of immigrants and emigrants are in use, making the data internationally non-comparable. As census and vital registration statistics are mostly quite accurate (except for the war years), some inference as to the effects of migration can be made by comparing rates of natural increase with rates of population increase according to the estimates of total population.

For the region as a whole, the migratory balance was inward in the 1920's, the 1940's, and the 1950's while in the 1930's it appears to have been negligible. In the 1920's, the population of France was augmented by more than one million as a result of net immigration which exceeded the low rate of natural increase at that time, and exceeded

also the combined net emigration from Germany, Austria and Switzerland.

The population of the Federal Republic of Germany was augmented by many millions in the 1940's, as a result of the resettlement of expellees, refugees and displaced persons and nearly three million more were added in the 1950's largely by continued immigration from Eastern Germany, although there was some migration overseas. France again had a net balance of immigration, as did Switzerland and, to a lesser extent, Belgium, while the Netherlands and Austria experienced small net migratory losses. France recently experienced an exceptional migratory gain owing to the return of many Frenchmen from Algeria.

Inward migratory balances such as those persisting in France may well continue on a scale which is not insignificant compared with the modest rates of natural increase in the population. Shortages of certain categories of workers have attracted many migrants from Southern Europe and these movements have been facilitated by international conventions. For the purpose of population projections, therefore, the possible effect of migration cannot be disregarded. Admittedly, migration may fluctuate widely with changes in economic conditions.

The migration assumptions implicit in the available national population projections are: annual net gains of 120,000 for France and 10,000 for Belgium, and annual net losses of 20,000 for the Netherlands and 10,000 for Austria, i.e., an annual net gain of 100,000 for the region as a whole.

6. Projections for countries, 1960-1980

For nearly all countries of Western Europe, comparable population projections had been assembled by the Office of European Economic Co-operation and these figures were used for the present purpose after certain adjustments, as explained above. For West Berlin, in view of the current excess of death over births and probable discontinuance of large-scale immigration from Eastern Germany in the future, a linear decrease of population to two million by 1980 was assumed without regard to the specific conditions which would produce this result.

Roughly in accord with past observation, it was assumed that the population of Luxembourg would maintain a fixed ratio to that of Belgium, the population of Monaco to that of France, and the population of Liechtenstein to that of Switzerland.

The projections for each country up to 1980 are shown in table A3.8. In the twenty-year period, the projected rates of population growth are moderate and diminish gradually with some exceptions (particularly in France and Belgium) due mainly to changes in age composition. Increases during 1960-1965 partly reflect the changes recorded in the most recent years, when there was migration on a scale unlikely to continue. In the twenty years, the figures show the population growing by 22 per cent in the Netherlands, 17 per cent in France and Switzerland, 10 per cent in the Federal Republic of Germany and Belgium and 3 per cent in Austria. Naturally, future conditions cannot be anticipated with such exactitude; in particular, migration between European countries has been intensified and the future balance of movements is largely unforeseeable. According to the "medium" projection, the population of the region would increase by 13 per cent in twenty years.

7. Variant and long-range projections

The long-range projections for the regional population were calculated independently of the national projections presented in the foregoing since comparability of assumptions was difficult to achieve on that basis. The mortality assumption was somewhat more optimistic than the assumptions used for the national projections, namely, an increase in expectation of life as in the sequence of United Nations model life tables until the value (for both sexes combined) of 73.9 years would be attained by 1975; this to be maintained to the end of the century.

For 1960, the regional sex-age adjusted birth rate was calculated as 19.7 per 1,000. Fertility in recent years has been moderately high in relation to its trends in the past thirty years. There have been periods during this time in which some of these countries had a gross reproduction rate below unity; hence, sex-age adjusted birth rates of 20 and 16 per 1,000, respectively, were taken as "high" and "low" assumptions for future trends. The "medium" assumption was taken as the average of results of the "high" and "low" variants, and was nearly in agreement

TABLE 12.5
Variant population projections for Western Europe, 1960-2000, with three alternative migration assumptions

| Variant | 1960 | 1970 | 1980 | 1990 | 2000 |
|---|-------|-------|-------|-------|-------|
| <i>A. Population (millions)</i> | | | | | |
| Migration assumption I: no net migration | | | | | |
| "High" | 134.5 | 143.8 | 152.8 | 162.2 | 173.3 |
| "Low" | 134.5 | 141.4 | 145.5 | 148.9 | 151.7 |
| "Medium" | 134.5 | 142.6 | 149.1 | 155.6 | 162.5 |
| Migration assumption II: net immigration of 200,000 per year | | | | | |
| "High" | 134.5 | 146.2 | 158.2 | 170.6 | 183.7 |
| "Low" | 134.5 | 143.8 | 150.9 | 157.3 | 162.1 |
| "Medium" | 134.5 | 145.0 | 154.5 | 164.0 | 172.9 |
| Migration assumption III: net immigration of 100,000 per year | | | | | |
| "High" | 134.5 | 145.0 | 155.5 | 166.4 | 178.5 |
| "Low" | 134.5 | 142.6 | 148.2 | 153.1 | 156.9 |
| "Medium" | 134.5 | 143.8 | 151.8 | 159.8 | 167.7 |
| <i>B. Decennial increase (per cent)</i> | | | | | |
| Migration assumption I: no net migration | | | | | |
| "High" | | 6.9 | 6.3 | 6.1 | 6.8 |
| "Low" | | 5.1 | 3.0 | 2.4 | 1.9 |
| "Medium" | | 6.0 | 4.7 | 4.3 | 4.4 |
| Migration assumption II: net immigration of 200,000 per year | | | | | |
| "High" | | 8.6 | 8.3 | 7.8 | 7.7 |
| "Low" | | 6.9 | 5.0 | 4.3 | 3.1 |
| "Medium" | | 7.8 | 6.6 | 6.1 | 5.5 |
| Migration assumption III: net immigration of 100,000 per year | | | | | |
| "High" | | 7.7 | 7.3 | 7.0 | 7.3 |
| "Low" | | 6.0 | 4.0 | 3.4 | 2.5 |
| "Medium" | | 6.9 | 5.7 | 5.2 | 5.0 |

"This assumption is retained for interregional comparisons.

with the sum of national population projections assuming "moderate" immigration.

The results are shown in table 12.5. Various migration assumptions were combined with the different fertility assumptions for the three variants. The assumption of no migration provides a background for comparison. In the national projections, the migration assumptions added up to a regional inward balance of 100,000 per year. Since, in most recent years, even more migrants came to Western Europe from other regions, an alternative assumption of twice as large a balance was also made. Where migratory balances were introduced, they were assumed to continue at the same level until 1980 and then diminish gradually so that there would be no further balance of movements by the end of the century.

The population of Western Europe would increase from 1960 to 2000 by nearly 29 per cent according to the "high" variant, and only 13 per cent according to the "low" variant assuming no migration. With large immigration (200,000 annually) the increase would be between 37 and 21 per cent; with a smaller migratory balance (100,000 annually) between 33 and 17 per cent. Perhaps, for the long run, the "medium" variant with immigration of 100,000 yearly is most indicated; according to this, the region's population would increase by about 25 per cent in the course of forty years.

For purposes of the world-wide tabulation of projections shown in annex 3 and the interregional comparisons in part II of this report, the figures according to migration assumption III (net immigration of 100,000 yearly) were retained for this region.

C. SOUTHERN EUROPE

1. Population growth, 1920-1960

Table A3.8 in annex 3 shows population estimates for Southern European countries from 1920 to 1960. The recent statistics are mostly accurate, but there were some deficiencies in birth and death registration in several countries during the 1920's, possibly also the 1930's, and vital statistics registration was disrupted in Yugoslavia during the war. The population estimates for Italy and Yugoslavia refer to the present territory. They have been calculated

by considering the differences between those estimates for various dates for Italy which include and those which exclude the area ceded to Yugoslavia, taking also into account the areas which formed the separate territory of Trieste during a few years following the war.

Despite considerable losses by emigration, the population of this region grew fairly rapidly during the 1920's and 1930's, when birth rates were comparatively high. In Greece, the large increase from 1920 to 1930 reflects a transfer of population from Turkey. In the 1940's, large military and civilian casualties occurred in Italy, Yugoslavia, and Greece, and the war-time hardships caused additional mortality. Widely varying rates of increase appear in population estimates for Albania, those for earlier dates being unreliable. Very high rates of increase in the 1950's make this country an exception in the region.

During the 1920-1960 period, the regional population increased by 42 per cent. The increase may have been nearly 100 per cent in Albania, and was 64 per cent in Greece, 48 per cent in Yugoslavia, 47 per cent in Portugal, 43 per cent in Spain, and 34 per cent in Italy. These differences resulted from various rates of natural increase and migratory balances.

2. Fertility

Table 12.6 shows the changes in birth rates from 1920 to 1960 in the principal countries of the region. In the region as a whole, the birth rate declined from an average of 31 per 1,000 in 1920-1924 to about 21 per 1,000 since 1950. The decline was fairly continuous except for a depression in 1940-1944 and a slight recovery in 1945-1949, but since about 1955 it seems to have been losing its momentum. The 1960-1962 birth rate was 26 per cent lower than in 1920-1924 in Portugal, 28 per cent lower in Spain, 35 per cent lower in Yugoslavia, 38 per cent lower in Italy, and 42 per cent lower in Greece, but some of these comparisons are faulty because of previously less complete registration. In Italy, Spain and Portugal, large decreases in the birth rate occurred between 1920 and 1940, whereas in Yugoslavia and Greece the declines were particularly steep in more recent years. The 1940-1944 birth rate for Yugoslavia is not known, but in view of the circumstances at that time, it may have been depressed as much as that of Greece.

TABLE 12.6
Crude birth rates in Southern Europe, 1920-1962
(Per 1,000 population)

| Country | 1920-1924 | 1925-1929 | 1930-1934 | 1935-1939 | 1940-1944 | 1945-1949 | 1950-1954 | 1955-1959 | 1960-1962 |
|-------------------------------|-----------|-----------|-----------|-----------|-------------------|-------------------|-----------|-----------|-------------------|
| Italy | 30.1 | 27.2 | 24.5 | 23.2 | 20.8 | 21.1 | 18.4 | 18.1 | 18.7 |
| Spain | 30.0 | 28.7 | 27.5 | 21.9 | 22.0 | 22.2 | 20.3 | 21.4 | 21.5 |
| Yugoslavia | 35.3 | 33.9 | 33.0 | 27.9 | . . | 28.2 ^a | 28.8 | 24.8 | 22.8 |
| Portugal | 33.0 | 31.7 | 29.3 | 27.1 | 24.5 | 25.6 | 24.0 | 24.2 | 24.4 |
| Greece ^b | 31.4 | 32.4 | 30.4 | 27.6 | 19.4 | 25.5 | 21.1 | 19.9 | 18.3 ^c |
| Weighted average | 31.2 | 29.3 | 27.4 | 24.3 | 21.4 ^d | 23.1 | 21.1 | 20.6 | 20.5 |

^a 1946-1949.

^b Except 1960-1962, as estimated in V. G. Valaoras, "A Reconstruction of the Demographic History of Modern Greece", *Milbank Memorial Fund Quarterly*, vol. 38, No. 2 (April 1960), pp. 115-139.

^c According to official record.

^d Excludes Yugoslavia.

TABLE 12.7
Gross reproduction rates in Southern Europe, 1920-1960

| Country | 1920-1923 | 1935-1939 | 1950-1954 | 1960 |
|----------------------------|-------------------|-------------------|-----------|------|
| Italy | 1.95 | 1.46 ^a | 1.16 | 1.16 |
| Spain | 1.96 ^b | 1.35 | 1.20 | 1.38 |
| Yugoslavia | 2.29 | .. | 1.71 | 1.38 |
| Portugal | 2.01 ^b | 1.72 | 1.50 | 1.55 |
| Weighted average | 2.01 | 1.45 ^c | 1.29 | 1.29 |

^a 1936-1939.
^b 1919-1922.
^c Excludes Yugoslavia.

As measured by the gross reproduction rate, fertility in the region decreased even more (see table 12.7). For Greece it has been calculated that the gross reproduction rate declined to 1.18 by 1960, a level comparable with that of Italy. Similar decreases of fertility in Yugoslavia have been compensated in part by rises in Spain and Portugal, whereas in Italy, there has been relatively little change since 1950. Previously much higher than in Western Europe, average fertility in Southern Europe has recently been nearly the same.

Vital statistics registration has been unreliable in Albania though it may have improved recently. Recorded birth rates averaged 38.9 per 1,000 in 1950-1954 and 41.8 per 1,000 in 1955-1959. From census data on age composition, a gross reproduction rate exceeding 3.0 has been calculated, making this country clearly exceptional in the region.

3. Mortality

The trends of recorded crude death rates of most countries of the region (estimated for Greece) are shown in table 12.8. The average regional death rate, 19.0 per 1,000 in 1920-1924 and 9.5 per 1,000 in 1960-1962, has been halved in forty years. It decreased considerably between 1920 and 1935, but first the Spanish Civil War and later the hardships and casualties of the Second World War retarded the decline. Much lower death rates were recorded from about 1945 onward, and the decrease appears to be continuing, though with reduced speed. The slower

TABLE 12.8
Crude death rates in Southern Europe, 1920-1962
(Per 1,000 population)

| Country | 1920-1924 | 1925-1929 | 1930-1934 | 1935-1939 | 1940-1944 | 1945-1949 | 1950-1954 | 1955-1959 | 1960-1962 |
|-------------------------------|-------------------|-----------|-----------|-----------|-------------------|-------------------|-----------|-----------|------------------|
| Italy | 17.8 ^a | 16.6 | 14.1 | 13.9 | 14.6 | 11.2 | 9.9 | 9.7 | 9.7 |
| Spain | 21.0 | 18.4 | 16.5 | 17.9 | 15.3 | 12.0 | 10.2 | 9.4 | 8.8 |
| Yugoslavia | 17.1 ^b | 20.0 | 18.4 | 15.9 | .. | 13.2 ^c | 12.4 | 10.5 | 9.6 |
| Portugal | 21.5 | 18.7 | 16.9 | 15.9 | 15.9 | 14.0 | 11.8 | 11.4 | 11.0 |
| Greece ^d | 21.2 ^a | 17.4 | 16.6 | 14.6 | 17.3 | 10.8 | 10.0 | 9.5 | .. |
| Weighted average | 19.0 | 17.8 | 15.8 | 15.5 | 15.2 ^c | 11.9 | 10.5 | 9.9 | 9.5 ^f |

^a 1921-1924.
^b 1922-1924.
^c 1946-1949.
^d Except 1960-1962, as estimated in V. G. Valaoras, "A Reconstruction of the

decline of recent years is due in part to the rising proportion of persons of advanced age owing to previous decreases in the birth rate.

Expectation of life at birth (both sexes) attained 70 years in Spain in 1960, 68 years in Italy in 1954-1957, 63 years in Yugoslavia in 1958-1959, and 62 years in Portugal in 1957-1958, according to official life tables. By interpolating and averaging the data from available life tables, average expectation of life in Southern Europe was estimated at 53 years in 1930 and about 62 years in 1950. Judging by the further decrease in death rates since the dates of the latest available life tables, the average was probably at least 67 years in 1960, if not more.

Again, the data for Albania may not be reliable. The recorded death rates amounted to 17.1 per 1,000 in 1936-1939, 14.3 per 1,000 in 1950-1954, and 9.9 per 1,000 in 1960-1962. The 1960-1962 death rate, in a population with only a small proportion of aged persons, suggests that mortality, though substantially reduced, was still somewhat higher than in other countries of the region.

4. Natural increase

Rates of natural increase are shown in table 12.9. For the region as a whole, these were of the order of 12 per 1,000 from 1920 to 1935, and 11 per 1,000 since 1945, with little apparent trend, as the average birth and death rates decreased at a similar pace. Because of war and other hardships, natural increase was reduced between 1935 and 1945. Natural increase has recently been diminishing in Yugoslavia and Greece and rising somewhat in Italy, Spain and Portugal.

5. Migration

For the region as a whole, the migratory balance was outward in the 1920's, small in the 1930's, and outward again from about 1945 to the present date. Probable inaccuracies in the vital statistics of earlier years and inconsistencies in official migration statistics make it impossible to calculate the balances with great accuracy.

Net emigration of 1 million if not more from Italy occurred in the 1920's, but in that decade Greece gained more than half a million migrants as a result of the population exchange with Turkey. More than 300,000 migrants a

Demographic History of Modern Greece", *Millbank Memorial Fund Quarterly*, vol. 38, No. 2 (April 1960), pp. 115-139.

^e Excludes Yugoslavia.

^f Excludes Greece.

TABLE 12.9
Crude rates of natural increase in Southern Europe, 1920-1962
(Per 1,000 population)^a

| Country | 1920-1924 | 1925-1929 | 1930-1934 | 1935-1939 | 1940-1944 | 1945-1949 | 1950-1954 | 1955-1959 | 1960-1962 |
|-----------------------------------|-------------|-------------|-------------|------------|--------------|-------------|-------------|-------------|---------------|
| Italy | (12.3) | 10.6 | 10.4 | 9.3 | 6.2 | 9.9 | 8.5 | 8.4 | 9.0 |
| Spain | 9.0 | 10.3 | 11.0 | 4.0 | 6.7 | 10.2 | 10.1 | 12.0 | 12.7 |
| Yugoslavia | (18.2) | 13.9 | 14.6 | 12.0 | . . | (15.0) | 16.4 | 14.3 | 13.2 |
| Portugal | 11.5 | 13.0 | 12.4 | 11.2 | 8.6 | 11.6 | 12.2 | 12.8 | 13.4 |
| Greece | (10.2) | 15.0 | 13.8 | 13.0 | 2.1 | 14.7 | 11.1 | 10.4 | . . |
| <i>Weighted average</i> | <i>12.2</i> | <i>11.5</i> | <i>11.6</i> | <i>8.8</i> | <i>(6.2)</i> | <i>11.1</i> | <i>10.7</i> | <i>10.8</i> | <i>(11.1)</i> |

^aFigures in parentheses subject to qualifications stated in footnotes to tables 12.6 and 12.8.

year, on an average, have been lost from the region during the years since 1945, affecting population growth to an appreciable extent in all countries except Yugoslavia and Albania. The year-to-year statistics fluctuate but suggest that net emigration overseas has had a tendency to subside gradually in recent years. This may have been partly compensated by more migration to Western Europe.

Net emigration assumptions in national population projections imply an annual net emigration during 1960-1980 of 34,000 from Italy; 48,000 from Portugal; 32,000 from Spain; 30,000 from Greece and 3,000 from Malta and Gozo, or a round total of 150,000 for the region. While this may be a reasonable expectation, it is not a large enough figure to be easily reconciled with the expectations

TABLE 12.10
Variant population projections for Southern Europe, 1960-2000, with three alternative migration assumptions

| Variant | 1960 | 1970 | 1980 | 1990 | 2000 |
|--|-------|-------|-------|-------|-------|
| <i>A. Population (millions)</i> | | | | | |
| Migration assumption I: no net migration | | | | | |
| “High” | 117.5 | 129.5 | 142.2 | 155.2 | 167.7 |
| “Low” | 117.5 | 127.2 | 135.0 | 142.2 | 146.5 |
| “Medium” | 117.5 | 128.4 | 138.6 | 148.7 | 157.1 |
| Migration assumption II: net emigration of 300,000 per year | | | | | |
| “High” | 117.5 | 125.9 | 134.2 | 142.6 | 152.0 |
| “Low” | 117.5 | 123.6 | 126.9 | 129.6 | 130.8 |
| “Medium” | 117.5 | 124.8 | 130.5 | 136.1 | 141.4 |
| Migration assumption III: net emigration of 150,000 per year | | | | | |
| “High” | 117.5 | 127.7 | 138.2 | 148.9 | 159.9 |
| “Low” | 117.5 | 125.4 | 131.0 | 135.9 | 138.7 |
| “Medium” | 117.5 | 126.6 | 134.6 | 142.4 | 149.3 |
| <i>B. Decennial increase (per cent)</i> | | | | | |
| Migration assumption I: no net migration | | | | | |
| “High” | | 10.3 | 9.8 | 9.1 | 8.1 |
| “Low” | | 8.3 | 6.2 | 5.3 | 3.1 |
| “Medium” | | 9.3 | 8.0 | 7.2 | 5.7 |
| Migration assumption II: net emigration of 300,000 per year | | | | | |
| “High” | | 7.2 | 6.5 | 6.3 | 6.6 |
| “Low” | | 5.2 | 2.7 | 2.1 | 1.0 |
| “Medium” | | 6.2 | 4.6 | 4.2 | 3.9 |
| Migration assumption III: net emigration of 150,000 per year | | | | | |
| “High” | | 8.7 | 8.2 | 7.8 | 7.4 |
| “Low” | | 6.7 | 4.4 | 3.7 | 2.1 |
| “Medium” | | 7.7 | 6.3 | 5.8 | 4.8 |

of immigration in Northern America, South America and Oceania where many of these migrants have gone in the past. From the standpoint of international consistency, alternative assumptions are made for the present long-range projections; the "moderate" assumption averaging those of "large" and "small" migration, provides for a net emigration of 225,000 individuals from Southern Europe per year until 1980, diminishing thereafter so as to vanish by the end of the century. It is obvious that prospects for future migration are difficult to assess since it cannot be estimated to what extent a diminishing overseas migration may be supplanted by increased migration within Europe.

6. Projections for countries, 1960-1980

Projections assembled by the Organization for European Economic Co-operation were adjusted and extended for Italy, Spain and Portugal, while national projections were found for Yugoslavia, Greece, and Malta and Gozo. No projection was found for Albania; it was considered that a population with birth and death rates such as recorded there might resemble the model of a quasi-stable population where the quinquennial increase amounts to about 18 per cent when an expectation of life at birth of 60 years is being approached, as may now be the case in that country. While further decreases in mortality are to be expected, it is not unlikely that some decrease in Albania's very high fertility may also set in, making it possible that population may grow at approximately constant rates during the next few five-year periods. The population of San Marino was assumed to grow in constant proportion to that of Italy, and of Andorra to Spain, while the population of Gibraltar and of the Holy See was assumed to remain unchanged. The resulting estimates are shown in table A3.8 of annex 3.

The sum of these projections, mostly reflecting the judgement of national experts, suggests an increase by 17 per cent in the region's population between 1960 and 1980. In the medium projection for the region, where the assumed emigration is larger, the increase is only 13 per cent. The indicated increase is 24 per cent in Yugoslavia, 19 per cent in Spain, 14 per cent in Italy and in Greece, and 10 per cent in Portugal though, of course, none of these can be foreseen with such precision. In Albania, there is the possibility that the population may double within twenty years.

7. Variant and long-range projections

The sex-age adjusted birth rate for the whole region of Southern Europe in 1960 was calculated as 19.5 per 1,000, nearly the same as in Western Europe. As there was no marked trend in Italy while fertility in Yugoslavia and Greece was declining, eventual stabilization at a sex-age adjusted birth rate of 20 per 1,000 was regarded as a "high" assumption. Below-unity reproduction has not been observed for any country of the region, though it has persisted for some time in parts of some countries such as North-western Italy and North-eastern Spain, where industrialization is most advanced. This makes it not unreasonable for a "low" assumption, that the gross reproduction rate of the region as a whole would descend to

little more than unity, corresponding approximately to a sex-age adjusted birth rate of 16 per 1,000. Hence, it appeared justifiable to make future assumptions for Southern Europe similar to those for Western Europe. The results of the variant projections are shown in table 12.10. Beside the assumption where no migration was taken into account, alternatives were calculated with annual balances of net emigration amounting to either 150,000 or 300,000 until 1980, and diminishing thereafter to disappear by the end of the century.

Increases of the regional population by 43, 25, or 34 per cent in those forty years are suggested by the "high", "low" and "medium" variants with no migration. With "large" emigration, the increases would range from only 11 per cent to 29 per cent depending on the fertility variant; with "small" emigration from 18 to 36 per cent. This range of prospects, namely, a forty-year increase of 11 to 43 per cent, is similar to the range calculated for Western Europe, namely 13 to 37 per cent, but the reasons differ. In Southern Europe, the age composition of the population, for some time to come, will favour somewhat higher birth rates and lower death rates than in Western Europe, even if fertility and mortality are nearly the same. The consequently greater natural increase in Southern Europe may be partly compensated by migration to Western Europe and overseas, though it is difficult to foresee whether it actually will be so. One possible comparison is to assume "medium" fertility in both regions, an annual immigration of 100,000 in Western Europe, and an annual emigration of 225,000 in Southern Europe. In the forty years from 1960 to 2000, the population of Western Europe would then increase by 25 per cent and that of Southern Europe by 24 per cent.

An average of migration assumptions II and III, namely, net emigration of 225,000 for Southern Europe, was used in the interregional comparisons of part II and the world-wide tabulation of projections in annex 3.

D. EASTERN EUROPE

1. Population growth, 1920-1960

All countries in Eastern Europe except Hungary have undergone changes in national territory since pre-war years. Official pre-war population estimates for the present areas are available for Romania and Czechoslovakia, but not for Bulgaria, Eastern Germany (except for 1936), or Poland, though estimates were found for that part of Poland which was national territory both before and after the war.⁷ Some of the estimates made for the present

⁷ To a large extent, the estimates of pre-war population within the present area of Eastern Germany and the new territories of Poland depend on a subtraction of estimates for the Federal Republic of Germany (see section A of this chapter) from estimates for the entire pre-war territory of Germany, with such indications as could be found of redistribution of population between these two former parts of Germany which do not belong to the present Federal Republic. In addition, estimates had to be made for East Berlin (assumed as roughly one-third the population of Berlin at each past date), the previously separate territory of Danzig, that portion of former East Prussia which has become part of the Soviet Union and, for 1920, part of the area then on the German-Polish border and subject to plebiscite. In the case of Bulgaria, the adjustment for the area previously part of Romania (Southern Dobruja) was made on the assumption that its population grew at the same rate as the population in the remainder of Bulgaria. It is evident that not all these adjustments are very accurate.

TABLE 12.11
Crude birth rates in Eastern Europe, 1920-1962
(Per 1,000 population)

| Country | 1920-1924 | 1925-1929 | 1930-1934 | 1935-1939 | 1940-1944 | 1945-1949 | 1950-1954 | 1955-1959 | 1960-1962 |
|--|-----------|-----------|-----------|-------------------|-------------------|-------------------|-----------|-----------|-------------------|
| Poland | 34.3 | 32.9 | 28.9 | 25.4 ^a | .. | 28.4 ^b | 30.1 | 27.1 | 20.9 |
| Romania | 37.6 | 35.4 | 33.7 | 30.2 | 23.2 | 24.9 ^c | 24.9 | 22.9 | 18.3 ^d |
| Czechoslovakia | 26.8 | 22.9 | 19.7 | 17.1 | 20.8 | 22.4 | 22.0 | 18.5 | 15.8 |
| Hungary | 30.2 | 26.6 | 23.2 | 20.1 | 19.3 ^c | 19.9 | 21.1 | 17.8 | 13.9 |
| Bulgaria | 39.6 | 34.2 | 30.3 | 24.1 | 22.1 | 24.6 | 21.7 | 18.7 | 17.6 ^d |
| Eastern Germany ^f | .. | .. | .. | 18.4 ^g | .. | 12.7 ^c | 16.6 | 16.1 | 17.3 ^d |
| <i>Weighted average</i> | | | | | | | | | |
| Excluding Eastern Germany | 33.3 | 30.8 | 27.5 | 24.1 | 21.5 ^b | 25.1 | 25.5 | 22.6 | 18.2 |
| Including Eastern Germany | .. | .. | .. | 23.1 | .. | 22.4 | 23.6 | 21.5 | 18.1 |

^a 1935-1938.

^b 1947-1949.

^c 1946-1949.

^d 1960-1961.

^e 1940-1943.

^f Including East Berlin.

^g 1938-1939.

^h Excluding Poland.

purpose and shown in table A3.8 of annex 3 are expressed in round figures to indicate their uncertainty.

Because of the problems of boundary changes, the estimated rates of population change in some of the countries and time-periods since 1920 are questionable, though the figures for the region as a whole may be satisfactory approximations. The estimates indicate that the regional population increased by about 12 per cent in the 1920's and about 8 per cent in the 1930's, and decreased nearly 7 per cent in the 1940's; in the 1950's the increase was again nearly 10 per cent. The increase in the entire forty-year period was about 23 per cent.

As estimated for Romania, Czechoslovakia and Hungary, and less reliably for Poland, population growth was less rapid in the 1930's than in the 1920's. The reduction of the rate of growth in Bulgaria between the 1920's and 1930's was particularly notable. In the 1940's, little or no population growth occurred in Romania and Hungary, while large losses in Poland and Czechoslovakia resulted mainly from population transfers to Germany. Part of the transferred population was resettled in Eastern Germany at that time, causing a temporary gain of population there which was mostly lost by subsequent migration to the Federal Republic of Germany. The latter movement continued during the 1950's causing a decrease of population in Eastern Germany which, however, slowed down towards 1960 when migration was much reduced. During the 1950's the population of Poland grew at a rather high rate and the increases were considerable in Romania and Czechoslovakia, but smaller in Hungary and Bulgaria. In the 1920-1960 period as a whole, population increased 55 per cent in Bulgaria, 48 per cent in Romania, 26 per cent in Hungary, and 5 per cent in Czechoslovakia. For Eastern Germany, the increase was estimated as 21 per cent and for Poland 14 per cent, but the two latter estimates may be somewhat inaccurate.

2. Fertility

Table 12.11 shows the trends in crude birth rates of Eastern European countries, though not within present

boundaries for pre-war years. There are gaps in the record for Poland in 1939-1946 and for Romania and Hungary in some years of the war. Since there are no data for Eastern Germany for most years prior to 1946, this country is not included in the first series of weighted regional averages. The average for 1940-1944 also excludes Poland for lack of data, and may be biased on this account as it is possible that the birth rate in Poland was then quite low.

Subject to these omissions, it can be noted that the average crude birth rate of the region declined remarkably, from about 33 per 1,000 in 1920-1924 to about 24 in 1935-1939 and probably much lower in 1940-1944, rose slightly around 1950 and recently dropped to only 18 per 1,000. Comparing the 1960-1962 birth rates with those of 1920-1924, one may say that the reduction in forty years was 56 per cent in Bulgaria, 54 per cent in Hungary, 51 per cent in Romania, 41 per cent in Czechoslovakia, and 39 per cent in Poland, but the comparison is uncertain because of changes in territory and possibly less complete birth registration in some of these countries in the 1920's. Eastern Germany also has a low birth rate, but here the most recent trend has been slightly upward.

The regional decrease in birth rates has been similar to that in Southern Europe, but it was even steeper during earlier decades as well as in recent years, especially since about 1955. Also, the post-war rise in the birth rate was larger and more prolonged than in Southern Europe.

Because of variations in age composition, the birth rates reflect changes in fertility less directly than the gross reproduction rates shown in table 12.12. In the 1920's the gross reproduction rate was greater than 2.0 in Poland, Romania, and Bulgaria, and greater than 1.5 in Czechoslovakia and Hungary, averaging nearly 2.0 for the entire region. Late in the 1930's, and again early in the 1950's the regional gross reproduction rate averaged between 1.4 and 1.5; by 1960 it had fallen to 1.23, comparable to the recent averages in Western and Southern Europe. A comparatively high gross reproduction rate was still recorded in Poland, but this has been falling. Below-unity reproduction occurred in Czechoslovakia in the 1930's, in Hungary recently, and probably also in Eastern

TABLE 12.12
Gross reproduction rates in Eastern Europe, 1919-1960

| Country | 1919-1922 | 1935-1939 | 1950-1954 | 1960 |
|---|-------------------|-------------------|-------------------|------|
| Poland | 2.16 | 1.46 ^a | 1.75 | 1.45 |
| Romania | 2.05 ^b | 1.81 | 1.34 ^c | 1.15 |
| Czechoslovakia | 1.57 | 0.97 ^d | 1.43 | 1.17 |
| Hungary | 1.58 ^e | .. | 1.30 | 0.98 |
| Bulgaria | 2.52 ^f | 1.46 | 1.23 | 1.13 |
| Eastern Germany ^g | .. | .. | 1.17 | 1.16 |
| Weighted average ^h | 1.98 | 1.45 ⁱ | 1.49 | 1.23 |

^a 1935-1938.

^b 1925-1929.

^c 1955-1959.

^d 1936.

^e 1919-1923.

^f 1920-1925.

^g Including East Berlin.

^h Excluding Eastern Germany. With Eastern Germany: 1.42 in 1950-1954 and 1.23 in 1960.

ⁱ Excluding Eastern Germany and Hungary.

Germany in certain past periods, though earlier data for the present area are not available; those three are the most industrialized countries of the region.

3. Mortality

The downward trend in the death rate during the past forty years, shown in table 12.13, bears witness to a drastic reduction in mortality throughout the period except for the interruption caused by the war and post-war hardships. Since about 1950, the death rates have been much lower than before the war, but owing to the rise in the proportion of aged persons in the population, they no longer decrease so rapidly. As the population has aged more in some countries than in others, current differences in the death rates do not measure the differences in age-specific risks of mortality. Thus, in Czechoslovakia, where the

infant mortality rate was 22.8 per 1,000 live births in 1960-1962, the crude death rate (9.5) was higher than in Poland (7.7), though in the latter country the infant mortality rate still averaged 55.8 per 1,000 births. Comparatively high and rising crude death rates in Eastern Germany are due to the fact that the proportion of aged persons in the population is high and rising; age-specific death rates in this country are quite low.

Expectation of life at birth according to available life tables attained 70 years in Czechoslovakia in 1960, 68 years in Poland in 1960-61 and in Eastern Germany in 1955-1958, 67 years in Hungary in 1958, 66 years in Bulgaria in 1956-1957, and 63 years in Romania in 1956. Interpolating and extrapolating from available life tables, one can estimate that the regional average expectation of life amounted to about 55 years towards 1940, about 60 years in 1950, and about 68 years in 1960.

4. Natural increase

Rates of natural increase are shown in table 12.14. From 1925 to 1939, and again from 1950 to 1962, natural increase diminished progressively as birth rates decreased faster than death rates. During 1940-1944, natural increase was probably slight and possibly negative in Poland, but the records of that severely troubled period have been largely lost. Natural increase was greater in Poland in recent years than in the 1920's while in Bulgaria it was decidedly less; in other countries it was comparable in the two periods, the long-term decreases in birth rates and death rates having been nearly equal.

5. Migration

Both in the 1920's and the 1930's, there was considerable emigration from countries in this region to Western Europe and overseas, causing a net migratory loss of perhaps 3 to 4 million, though it is difficult to calculate accurately the amount of the loss. In those periods, Eastern Europe was less advanced industrially than at present while in the areas of immigration, manpower with modest

TABLE 12.13
Crude death rates in Eastern Europe, 1920-1962

(Per 1,000 population)

| Country | 1920-1924 | 1925-1929 | 1930-1934 | 1935-1939 | 1940-1944 | 1945-1949 | 1950-1954 | 1955-1959 | 1960-1962 |
|--|-----------|-----------|-----------|-------------------|-------------------|-------------------|-----------|-----------|-------------------|
| Poland | 20.6 | 17.0 | 15.0 | 14.0 ^a | .. | 14.4 ^b | 11.4 | 9.0 | 7.7 |
| Romania | 24.0 | 21.6 | 20.3 | 20.0 | 19.1 | 17.5 ^c | 12.0 | 9.7 | 8.7 ^d |
| Czechoslovakia | 16.5 | 15.2 | 13.7 | 13.2 | 14.3 | 13.6 | 10.9 | 9.4 | 9.5 |
| Hungary | 20.9 | 17.3 | 15.8 | 14.3 | .. | 14.8 | 11.4 | 10.3 | 10.2 |
| Bulgaria | 21.3 | 18.5 | 15.8 | 13.9 | 13.1 | 13.3 | 10.2 | 8.9 | 8.0 ^a |
| Eastern Germany ^e | .. | .. | .. | 12.3 ^f | .. | 15.9 ^c | 11.9 | 12.6 | 13.3 ^d |
| Weighted average | | | | | | | | | |
| Excluding Eastern Germany | 20.5 | 17.7 | 15.9 | 15.1 | 16.1 ^g | 14.8 | 11.3 | 9.8 | 8.6 |
| Including Eastern Germany | .. | .. | .. | 15.1 | .. | 15.1 | 11.4 | 10.0 | 9.1 |

^a 1935-1938.

^b 1947-1949.

^c 1946-1949.

^d 1960-1961.

^e Including East Berlin.

^f 1938-1939.

^g Romania, Czechoslovakia and Bulgaria only.

TABLE 12.14
Rates of natural increase in Eastern Europe, 1960-1962
(Per 1,000 population)

| Country | 1920-1924 | 1925-1929 | 1930-1934 | 1935-1939 | 1940-1944 | 1945-1949 | 1950-1954 | 1955-1959 | 1960-1962 |
|--|-----------|-----------|-----------|-------------------|------------------|-------------------|-----------|-----------|------------------|
| Poland | 13.7 | 15.9 | 13.9 | 11.4 ^a | .. | 17.0 ^b | 18.7 | 18.1 | 13.2 |
| Romania | 13.6 | 13.8 | 13.4 | 10.2 | 4.1 | 7.4 ^c | 12.9 | 13.2 | 9.6 ^d |
| Czechoslovakia | 10.3 | 7.7 | 6.0 | 3.9 | 6.5 | 8.8 | 11.1 | 8.8 | 6.3 |
| Hungary | 9.3 | 9.3 | 7.4 | 5.8 | .. | 5.1 | 9.7 | 7.5 | 3.7 |
| Bulgaria | 18.3 | 15.7 | 14.5 | 10.2 | 9.0 | 11.3 | 11.5 | 9.8 | 9.6 ^d |
| Eastern Germany ^e | .. | .. | .. | 6.1 ^f | .. | -3.2 | 4.7 | 3.5 | 4.0 ^d |
| <i>Weighted average</i> | | | | | | | | | |
| Excluding Eastern Germany | 12.8 | 13.1 | 11.6 | 9.0 | 6.2 ^g | 10.3 | 14.2 | 12.8 | 9.6 |
| Including Eastern Germany | .. | .. | .. | 8.0 | .. | 7.3 | 12.2 | 11.5 | 9.0 |

^a 1935-1938.

^b 1947-1949.

^c 1946-1949.

^d 1960-1961.

^e Including East Berlin.

^f 1938-1939.

^g Romania, Czechoslovakia and Bulgaria only.

levels of skill could then be absorbed in greater numbers than would now be the case.

Large population transfers occurred during and shortly after the last war. The effect of the transfers to Germany is evident in the population estimates for Poland and Czechoslovakia, but there have also been population exchanges between Poland and the Soviet Union and, on a smaller scale, among these countries. Eastern Germany lost almost two million migrants to the Federal Republic of Germany within the 1950-1960 decade, but this movement has slowed down more recently. About 1956, events in Hungary caused emigration estimated at more than 100,000 persons. At the present time, no large migratory movements are to be foreseen, nor have any assumptions of net migration been made in the national population projections for countries in this region. There is some likelihood that a small outward balance from this region may persist in the course of future years, and for this reason, the "high", "low" and "medium" variants of the regional projections allow for an annual net emigration of 7,500 individuals for the period from 1960 to 1980, and smaller numbers after 1980 as assumed elsewhere.

6. Projections for countries, 1960-1980

The population projections for Eastern European countries, 1960-1980, shown in table A3.8 of annex 3, are those calculated by the national demographic and statistical services, adjusted to the population estimates for 1960 and extrapolated beyond 1975 in two instances. These estimates suggest an almost constant increase of the regional population by approximately 4 per cent in each quinquennium, resulting in an increase of about 17 per cent within twenty years. Very nearly the same result was obtained in the regional projection made on the "medium" assumption. This is similar to the increase expected in Southern Europe, but higher than in Western Europe, mainly because of differences in age composition while average levels of fertility and mortality are nearly the same.

The increase in the twenty-year period indicated by the projections is 28 per cent in Poland, 21 per cent in Romania, 18 per cent in Bulgaria, 16 per cent in Czechoslovakia, 7 per cent in Hungary, and only 2 per cent in Eastern Germany. These differences result mostly from present differences in the fertility level and trend and differences in age composition due mainly to previous fertility trends. Of course, population growth cannot be foreseen with such exactitude, but it is likely to be appreciably more rapid in some countries than in others for a number of years to come.

7. Variant and long-range projections

Observations of past fertility trends suggested that the "high" and "low" assumptions made for other parts of Europe might have equal validity in Eastern Europe. As has been noted, below-unity reproduction has already occurred in some parts of the region, and though the gross reproduction rate now averages 1.23, fertility in some of the countries has been decreasing considerably in recent years, and the decrease may continue. On the other hand, there may be some rise in fertility in those areas where it is now particularly low. Hence, the regional sex-age adjusted birth rate, calculated as 19.7 per 1,000 for 1960, was assumed eventually to settle at 20.0 for the "high" and at 16.0 for the "low" assumption. The variant results are shown in tables A3.2 to A3.4, annex 3. A small balance of emigration was assumed for the "high", "low" and "medium" variants.

Because of changes in age composition, population growth may slow down somewhat in the course of future decades. It would reach a low rate by the end of the century on the "low" assumption, but would remain appreciable on the "high" assumption. According to the three alternative variants, the increase in forty years would be +2, 24 or 33 per cent respectively. These increases are larger than those indicated by the corresponding assumptions for Western Europe, but similar to those for Southern Europe on the assumption of no net migration.

TABLE 12.15
Crude birth rates in Northern Europe, 1920-1962^a
(Per 1,000 population)

| Country | 1920-1924 | 1925-1929 | 1930-1934 | 1935-1939 | 1940-1944 | 1945-1949 | 1950-1954 | 1955-1959 | 1960-1962 |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------|
| United Kingdom | 21.7 | 17.6 | 15.8 | 15.3 | 16.0 | 18.3 | 15.9 | 16.4 | 17.9 |
| Sweden | 20.3 | 16.3 | 14.4 | 14.5 | 17.7 | 19.0 | 15.5 | 14.5 | 13.9 |
| Denmark | 23.1 | 19.8 | 17.9 | 17.9 | 20.3 | 21.6 | 17.9 | 16.8 | 16.7 |
| Finland | 25.4 | 22.8 | 20.0 | 20.2 | 20.1 | 27.0 | 22.8 | 19.9 | 18.3 |
| Norway | 23.5 | 18.5 | 15.7 | 15.0 | 17.7 | 20.8 | 18.7 | 18.1 | 17.4 |
| Ireland | 20.5 | 20.3 | 19.5 | 19.4 | 20.9 | 22.5 | 21.4 | 21.1 | 21.5 |
| Iceland | 27.0 | 25.5 | 24.3 | 20.9 | 23.4 | 27.2 | 27.9 | 28.3 | 28.0 ^a |
| Weighted average | 21.9 | 18.0 | 16.2 | 15.8 | 16.9 | 19.3 | 16.7 | 16.7 | 17.6 |

^a 1960.

E. NORTHERN EUROPE

1. Population growth, 1920-1960

The population of the countries in Northern Europe grew from 1920 to 1960 as shown in table A3.9, annex 3. The increase in the region's population was about 5 per cent in each decade, slightly more in the 1940's and slightly less in the 1950's. The nearly constant rate of growth, while rates of natural increase varied, can be ascribed to the partly compensating effects of international migration, particularly in the United Kingdom which contains the majority of the population. In the other countries, rates of increase fluctuated, reaching a maximum in the 1940's in Sweden and Denmark, in the 1950's in Finland, and around 1950 in Norway. In Ireland, population decreased in the 1920's and again in the 1950's and increased slightly in the 1930's and 1940's. A comparatively high and accelerating rate of increase makes Iceland another exception in this region, while population in the smaller islands has been fluctuating.

In the forty-year period as a whole, the regional population increased by 22 per cent. The increase was 89 per cent in Iceland, 41 per cent in Denmark and Finland, 36 per cent in Norway, 27 per cent in Sweden, and 20 per cent in the United Kingdom, whereas in Ireland there was a decrease of 9 per cent.

2. Fertility

The trends in crude birth rates from 1920 to 1962 are described in table 12.15. In the regional average, the birth rate decreased from about 22 per 1,000 in 1920-1924 to about 16 in the 1930's, rose to 19 in 1945-1949, and has fluctuated about 17 since 1950. This trend is very similar to the one observed in Western Europe, except that here the average birth rates were even lower in the 1930's. In nearly every period, the crude birth rate in the United Kingdom was slightly below the regional average, but a relative rise appears in the most recent years. Birth rates averaged somewhat higher in Denmark and lower in Sweden and had a trend similar to each other, but their rise came earlier in the 1940's and was larger and their most recent trend has still been downward. The trend in

Norway is intermediate between that of the United Kingdom and those of Sweden and Denmark. Birth rates have been comparatively high in Finland and Iceland, but whereas they declined considerably in Finland in the 1950's, no such decline is noted in Iceland. In Ireland, the birth rate has varied within a rather narrow range, mostly between 20 and 22 per 1,000.

Because of changes in age composition of the population, the crude birth rates do not accurately reflect the trends in fertility, as illustrated by the gross reproduction rates assembled in table 12.16. The gross reproduction rate for the region averaged 1.3 in 1920-1924 and again in 1960, but the average regional birth rate was markedly lower at the more recent date. Ireland has comparatively high fertility, but its crude birth rate is not particularly high, as the young adult population tends to be depleted by emigration. In the 1930's the gross reproduction rate of Northern European countries other than Ireland and Iceland was below unity, or only slightly above unity. From 1950-1954 to 1960, a noticeable rise in fertility occurred in the United Kingdom, Norway and Ireland, and a fall in Finland, while there was little change in Sweden and Denmark though crude birth rates decreased in those two countries.

TABLE 12.16
Gross reproduction rates in Northern Europe, 1920-1960

| Country | 1920-1924 | 1935-1939 | 1950-1954 | 1960 |
|-----------------------------|-------------------|-----------|-----------|-------------------|
| United Kingdom: | | | | |
| England and Wales | 1.25 ^a | 0.90 | 1.06 | 1.29 |
| Scotland | 1.45 ^a | 1.05 | 1.20 | 1.41 |
| Sweden | 1.34 | 0.87 | 1.09 | 1.06 |
| Denmark | 1.43 | 1.04 | 1.24 | 1.24 |
| Finland | 1.67 | 1.18 | 1.47 | 1.29 |
| Norway | 1.69 ^b | 0.89 | 1.25 | 1.39 |
| Ireland | 1.52 ^c | 1.43 | 1.60 | 1.83 ^d |
| Weighted average | 1.33 | 0.96 | 1.14 | 1.31 |

^a 1919-1923.

^b 1920-1921.

^c 1924-1928.

^d 1959.

TABLE 12.17
Crude death rates in Northern Europe, 1920-1962
(Per 1,000 population)

| Country | 1920-1924 | 1925-1929 | 1930-1934 | 1935-1939 | 1940-1944 | 1945-1949 | 1950-1954 | 1955-1959 | 1960-1962 |
|-----------------------------------|-------------|-------------|-------------|-------------|-------------------|-------------|-------------|-------------|------------------|
| United Kingdom | 12.5 | 12.5 | 12.2 | 12.2 | 13.3 ^a | 11.6 | 11.7 | 11.7 | 11.8 |
| Sweden | 12.4 | 12.1 | 11.6 | 11.7 | 10.8 | 10.4 | 9.7 | 9.6 | 10.0 |
| Denmark | 11.6 | 11.1 | 10.8 | 10.6 | 10.0 | 9.6 | 9.0 | 9.1 | 9.6 |
| Finland | 14.8 | 14.0 | 12.9 | 13.5 | 17.3 | 11.8 | 9.7 | 9.1 | 9.2 |
| Norway | 11.8 | 11.0 | 10.4 | 10.3 | 10.2 | 9.3 | 8.6 | 8.8 | 9.2 |
| Ireland | 14.6 | 14.5 | 14.1 | 14.3 | 14.6 | 13.7 | 12.5 | 12.0 | 11.9 |
| Iceland | 14.3 | 11.7 | 10.9 | 10.8 | 10.2 | 8.5 | 7.5 | 7.1 | 6.8 ^b |
| <i>Weighted average</i> | <i>12.6</i> | <i>12.5</i> | <i>12.1</i> | <i>12.1</i> | <i>13.0</i> | <i>11.4</i> | <i>11.1</i> | <i>11.0</i> | <i>11.2</i> |

^a Excluding deaths among the armed forces.

^b For 1960-1961.

3. Mortality

The trend in the regional crude death rate is shown in table 12.17. Because of progressive aging of the population, the crude death rate decreased little over the past forty years despite considerable improvements in health conditions and reductions in specific death rates at nearly all ages. For the same reason, the recent gradual rise in the crude death rate in several countries is consistent with the maintenance of low age-specific risks. Age-specific mortality rates in most of these countries now being among the lowest in the world, a slow continuing rise in the regional average crude death rate is probable although further progress in the control of diseases is still possible.

The latest available official data show an expectation of life at birth (both sexes) of 73 years in Sweden (1960) and Norway (1951-1955), 71 years in the United Kingdom (1960) and Denmark (1951-1955), 68 years in Iceland (1941-1950), 67 years in Finland (1951-1955), and 66 years in Ireland (1950-1952). Interpolating and extrapolating from available life tables, one can estimate that average expectation of life in the region was about 65 years in 1940, 69 years in 1950, and more than 71 years in 1960.

4. Natural increase

The rates of natural increase, shown in table 12.18 have been mostly moderate or low except in Iceland, where

population has been growing faster and the rate has recently accelerated. In the other countries, the natural increase rate diminished progressively from 1920 until about 1940 or 1945. It rose to a temporary peak in or around 1945-1949 and, in most countries, receded thereafter to a level slightly higher than that of the 1930's. There was a small renewed rise in the United Kingdom in the most recent years, but in other countries the gradual declines have continued.

5. Migration

In view of the accuracy of population and vital statistics for the Northern European countries, net migratory balances can be estimated from the difference between recorded population change and recorded natural increase.

For the region as a whole, the migratory balance was outward in the 1920's and the 1950's, inward in the 1930's, and negligible in the 1940's. Most of the migrants went to or returned from overseas areas. The lack of shipping space in the 1940's prevented many movements which might otherwise have occurred in that period.

The region lost more than 1½ million migrants in the balance of movements occurring in the 1920's. The United Kingdom lost over one million, Ireland about 300,000, and Sweden and Norway about 100,000 each. Because of the economic depression and refugee movements which caused the return of many previous migrants to their

TABLE 12.18
Crude rates of natural increase in Northern Europe, 1920-1962
(Per 1,000 population)

| Country | 1920-1924 | 1925-1929 | 1930-1934 | 1935-1939 | 1940-1944 | 1945-1949 | 1950-1954 | 1955-1959 | 1960-1962 |
|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------|
| United Kingdom | 9.2 | 5.1 | 3.6 | 3.1 | 2.7 | 6.7 | 4.2 | 4.7 | 6.1 |
| Sweden | 7.9 | 4.2 | 2.8 | 2.8 | 6.9 | 8.6 | 5.8 | 4.9 | 3.9 |
| Denmark | 11.5 | 8.7 | 7.1 | 7.3 | 10.3 | 12.0 | 8.9 | 7.7 | 7.1 |
| Finland | 10.6 | 8.8 | 7.1 | 6.7 | 2.8 | 15.2 | 13.1 | 10.8 | 9.1 |
| Norway | 11.7 | 7.5 | 5.3 | 4.7 | 7.5 | 11.5 | 10.1 | 9.3 | 8.2 |
| Ireland | 5.9 | 5.8 | 5.4 | 5.1 | 6.3 | 8.8 | 8.9 | 9.1 | 9.6 |
| Iceland | 12.7 | 13.8 | 13.4 | 10.1 | 13.2 | 18.7 | 20.4 | 21.2 | 21.4 ^c |
| <i>Weighted average</i> | <i>9.2</i> | <i>5.6</i> | <i>4.1</i> | <i>3.7</i> | <i>3.8</i> | <i>8.0</i> | <i>5.6</i> | <i>5.7</i> | <i>6.4</i> |

^c 1960.

countries of origin, the region had a migratory gain of about three quarters of a million in the 1930's and most of this gain accrued to the United Kingdom. In the Scandinavian countries, migratory gains in the 1930's totalled nearly 100,000 whereas there was a net emigration of about 100,000 persons from Ireland. In the 1950's the net migratory loss to the region amounted to about one million, of which more than half a million were lost to the United Kingdom, and at least 300,000 to Ireland. There were also significant migratory losses in Denmark, Finland and Norway in the 1950's, whereas Sweden had an appreciable balance of immigration in this period.

In the national population projections considered below, the assumptions concerning future migration are: annual net emigration of 30,000 from the United Kingdom, 24,000 from Ireland, 6,000 from Denmark, 3,000 from Finland, and 1,000 from Norway or, in rounded figures, a net emigration of 65,000 persons a year from the region. Though there has been some net immigration in Sweden recently, the projection for this country was based on the assumption that in the future the migratory balance would be negligible.

As noted in the migration assumptions of national projections for the United States, Canada, Australia and New

Zealand, a larger number of immigrants is expected in those countries. For the purpose of long-range projections of the regional population, somewhat larger net emigration was assumed than in the national projections, but much smaller than would be consistent with the expectations of immigration in the overseas countries. Thus, annual net emigration of 97,500 persons from Northern Europe was assumed until 1980 and a gradually diminishing number thereafter, this being an average of alternative assumptions in which annual net emigration is calculated as either 65,000 or 130,000.

6. Projections for countries, 1960-1980

Population projections for the United Kingdom, Sweden, Denmark, Norway and Ireland were taken from the data assembled by the Organization for European Economic Co-operation, while for Finland a national projection was found in a recent publication. For Iceland, only the rough assumption was made, that the population would increase in the future by 15,000 individuals every five years, and for the smaller islands, that their combined population would increase by 2,000 every five years. The consequent future population estimates, as adapted and extended, are brought together in table A3.8 of annex 3.

TABLE 12.19
Variant population projections for Northern Europe, 1960-2000 according to three alternative migration assumptions

| Variant | 1960 | 1970 | 1980 | 1990 | 2000 |
|--|------|------|------|------|------|
| <i>A. Population (millions)</i> | | | | | |
| Migration assumption I: no net migration | | | | | |
| "High" | 75.8 | 80.9 | 86.1 | 91.1 | 96.7 |
| "Low" | 75.8 | 79.6 | 82.0 | 83.6 | 84.5 |
| "Medium" | 75.8 | 80.3 | 84.0 | 87.3 | 90.6 |
| Migration assumption II: net emigration of 130,000 per year | | | | | |
| "High" | 75.8 | 79.4 | 82.6 | 85.6 | 89.9 |
| "Low" | 75.8 | 78.1 | 78.4 | 78.2 | 77.7 |
| "Medium" | 75.8 | 78.7 | 80.5 | 81.9 | 83.8 |
| Migration assumption III: net emigration of 65,000 per year ^a | | | | | |
| "High" | 75.8 | 80.2 | 84.3 | 88.3 | 93.3 |
| "Low" | 75.8 | 78.9 | 80.2 | 80.9 | 81.1 |
| "Medium" | 75.8 | 79.5 | 82.3 | 84.6 | 87.2 |
| <i>B. Decennial increase (per cent)</i> | | | | | |
| Migration assumption I: no net migration | | | | | |
| "High" | | 6.8 | 6.3 | 5.8 | 6.1 |
| "Low" | | 5.1 | 2.9 | 2.0 | 1.1 |
| "Medium" | | 6.0 | 4.6 | 4.0 | 3.7 |
| Migration assumption II: net emigration of 130,000 per year | | | | | |
| "High" | | 4.8 | 4.0 | 3.7 | 5.0 |
| "Low" | | 3.0 | 0.5 | -0.4 | -0.6 |
| "Medium" | | 3.9 | 2.2 | 1.7 | 2.3 |
| Migration assumption III: net emigration of 65,000 per year ^a | | | | | |
| "High" | | 5.8 | 5.2 | 4.8 | 5.6 |
| "Low" | | 4.1 | 1.7 | 0.9 | 0.3 |
| "Medium" | | 4.9 | 3.4 | 2.9 | 3.0 |

According to the sum of these estimates, the regional population would increase at a moderate and possibly diminishing rate, resulting in a gain of 10 per cent within the twenty-year period 1960 to 1980 (with somewhat larger emigration as in the medium assumption for the region, the gain would be only 7 per cent). The increase would be 19 per cent in Finland and Norway, 14 per cent in Denmark, 12 per cent in Sweden, 9 per cent in the United Kingdom, and 1 per cent in Ireland. In Iceland, with its present high rate of population growth, a much larger proportionate gain is indicated, but a detailed projection was not calculated. The range of future increases foreseen for countries in this region is similar to that for Western European countries, though in this region some emigration was assumed.

7. Variant and long-range projections

Recent fertility trends in Northern Europe have been quite similar to those in Western Europe; hence, it is appropriate to make analogous assumptions with respect to the future. The sex-age adjusted birth rate was calculated as 20.45 per 1,000 in 1960 for the Northern European region, reflecting mainly a small rise in fertility which occurred quite recently in the United Kingdom, but which is not certain to continue. The immediate post-war recovery of the birth rate was less extensive and shorter in the United Kingdom than in other countries of the region, and the trend of fertility is now downward in the Scandinavian countries, where the recovery occurred earlier.

Three migration assumptions were considered: no net migration, and annual net emigration of either 65,000 or 130,000 persons to continue until 1980 and thereafter to diminish. The future estimates resulting from the several combinations of assumptions are shown in table 12.19. According to most of these assumptions, the decennial rates of population increase would be rather small and diminishing, becoming almost negligible towards the end of the century. The population would begin to decrease before the year 2000 if the "low" variant should prevail with respect to fertility and if emigration were comparatively large.

According to the "high", "low" and "medium" variants, migration not being taken into account, the increases of the population of Northern Europe from 1960 to 2000 would be 28 per cent, 12 per cent, and 20 per cent respectively. With "large" emigration, the corresponding increases would be only 19 per cent, 3 per cent, and 11 per cent, while with "small" emigration, they would amount to 23, 7 or 15 per cent, respectively. If the comparative regional prospects have been correctly assessed, this part of Europe is the region in which the slowest future growth of population should be expected. But such an expectation is far from certain and changes can occur at any time which may call for a substantial revision of the present estimates.

An average of migration assumptions II and III, representing annual emigration of 97,500 was used in the interregional comparisons in part II and the tabulation of projections on a world-wide basis in annex 3.

Chapter 13

THE UNION OF SOVIET SOCIALIST REPUBLICS

1. POPULATION GROWTH, 1920-1960

The Soviet Union has been involved in two major wars, one in 1914-1917 and another in 1941-1945, each of which caused severe devastation and loss of life, and each of which was followed by large changes in the national boundaries. During the periods of war and reconstruction, population statistics were not maintained currently. An exact record of the demographic history of the Soviet Union within present boundaries is therefore lacking, though estimates can be made with a fair degree of approximation.

The following data were communicated to the United Nations by the Central Statistical Office of the Soviet Union: in 1897, a population census of the Russian Empire enumerated 128.2 million inhabitants, and censuses of the Soviet Union recorded 147.0 million in 1926, 170.6 million in 1939 and 208.8 million in 1959. The Russian Empire included some areas which are not part of the Soviet Union and excluded others which are, and in 1926 and 1939 the territory of the Soviet Union was smaller than it is at present. According to official estimates, the population within the present boundaries of the Soviet Union was 124.6 million in 1897, 159.2 million in 1913, 163.0 million in 1917, and 194.1 million on 1 January 1940. Beginning with 178.5 million as of 1 January 1950, there is a continuous series of annual population estimates for the Soviet Union's present territory. Within the smaller territory of 1939, the population has officially been estimated as 139.3 million in 1913, 143.5 million in 1917, 136.8 million in 1920, 153.4 million in 1929, and 163.8 million in 1937; these figures can be compared with the results of censuses in 1926 and 1939 mentioned above.

TABLE 13.1
Population estimates, 1900-1960, for the USSR
within present boundaries (rounded figures)

| Year (mid-year date) | Population (millions) ^a | Decennial increase (per cent) |
|-------------------------|---------------------------------------|----------------------------------|
| 1900 | 127.1 | . . . |
| 1910 | 150.5 | 18.4 |
| 1920 | 155.3 | 3.2 |
| 1930 | 179.0 | 15.3 |
| 1940 | 195.0 ^b | 8.9 |
| 1950 | 180.0 ^b | -7.7 |
| 1960 | 214.4 ^c | 19.1 |

^a Estimates 1900-1930 according to Biraben, adjusted to agree with official estimates for other dates.

^b Official estimate for 1 January adjusted to mid-year.

^c Official estimates.

An independent series of annual population estimates covering the present territory of the Soviet Union from 1860 to 1957 has been calculated by Jean-Noël Biraben.¹ His estimates for 1897, 1913, 1917 and 1940 differ slightly from the official estimates for the same dates. When adjustments are made for those small differences, population estimates for decennial dates are obtained which are consistent with the official data. Because of the disturbances which were caused by wars, it is important to follow this population trend from the beginning of the century, as is done in table 13.1.

The rate of population growth was high and rising at the beginning of this century, but the increase that might have been expected for the decade from 1910 to 1920 was nearly offset by the casualties and hardships of the First World War and by the Civil War and foreign interventions which continued until 1922. The population increased again at a considerable rate in the course of the 1920's but early in the 1930's, partly as a consequence of the great social changes at that time, the rate of growth seems to have been much reduced. About 1937-1939, population grew at a high rate once more. The severe military and civilian casualties of the Second World War caused a net population decrease between 1940 and 1950. The period between 1950 and 1960 was the first decade with population growth at a rate as high as it was at the beginning of the century.

2. FERTILITY, MORTALITY AND NATURAL INCREASE

International migration has rarely been large in proportion to population in the Soviet Union (or the former Russian Empire). A migratory loss in the 1940's, partly due to mass deportation and partly to transfers in the post-war settlement, has been calculated by some students, but the circumstances of that period were exceptional and are certainly not indicative of any migratory tendency normally to be expected. With this exception, variations in the rate of population growth have resulted mainly from variations in the birth and death rates, including the large numbers of deaths which occurred in the war periods. The trends of birth and death rates consistent with census data and other estimates have been officially recorded as shown in table 13.2.

In the nineteenth century, the birth rate was very high, possibly near 50 per 1,000. It is estimated to have decreased

¹ Jean-Noël Biraben, "Essai sur l'évolution démographique de l'URSS", *Population* (Paris), vol. 13, n° 2 bis, Juin 1958 (numéro spécial). The series of estimates was extended by a projection up to 1971. The calculation of total population, though made before the census taken in 1959, came very close to the census data.

TABLE 13.2

Estimated crude birth rates, death rates and rates of natural increase in the USSR, 1900-1963
(Per 1,000 population)

| Period | Birth rate | Death rate | Rate of natural increase |
|------------------------|------------|------------|--------------------------|
| 1900-1904 ^a | 48.6 | 30.9 | 17.7 |
| 1905-1909 ^a | 45.8 | 29.6 | 16.2 |
| 1910-1914 ^a | 43.7 | 27.6 | 16.1 |
| 1926-1928 ^b | 44.4 | 22.6 | 21.8 |
| 1937-1940 ^b | 36.0 | 18.0 | 18.0 |
| 1950-1954 | 26.4 | 9.4 | 17.0 |
| 1955-1959 | 25.3 | 7.7 | 17.6 |
| 1960 | 24.9 | 7.1 | 17.8 |
| 1961 | 23.8 | 7.2 | 16.6 |
| 1962 | 22.4 | 7.5 | 14.9 |
| 1963 | 21.3 | 7.3 | 14.0 |

Source: Communication of the Central Statistical Office of the USSR.

^a Fifty provinces of European Russia.

^b Reduced territory at the time.

to about 44 per 1,000 at the outbreak of the First World War. After the war-induced birth deficit, a recovery occurred in the 1920's, bringing the birth rate temporarily up to its pre-war level. During the period of the first five-year plan, the birth rate apparently dropped considerably, and then partly recovered, but in the latter part of the 1930's, its level was lower than in the 1920's. In 1940, the last pre-war year of record, the birth rate was 31.3 per 1,000. Since the Second World War, a moderate birth rate has been maintained showing a gradually decreasing tendency since 1960.

The death rate, previously exceeding 30 per 1,000, had begun to decrease somewhat by the beginning of the present century. After the period of excessive deaths caused by the First World War, a considerably lower death rate was reached in 1926-1928, and a still lower rate in 1937-1940. Enormous losses were caused by the Second World War. Since the end of the latter the death rate has fallen to a far lower level than recorded in earlier periods.

During the years since 1950 for which annual birth rates have been published, there has been a very slow decrease in the crude birth rate of the Soviet Union. Age-specific birth rates show slight declines in recent years for women over twenty-five years of age, continuing a longer-range past trend, while the rates for younger women have risen somewhat, as follows:²

| Age of women (years) | Annual birth rates per 1,000 women of given ages | | | 1960-1961 as percentage of 1938-1939 rate |
|----------------------|--|-----------|-----------|---|
| | 1938-1939 | 1957-1958 | 1960-1961 | |
| 15-24 | 121.4 | 90.8 | 119.1 | 98 |
| 25-29 | 230.6 | 166.7 | 160.7 | 70 |
| 30-34 | 183.5 | 116.4 | 110.0 | 60 |
| 35-39 | 131.7 | 66.8 | 60.7 | 46 |
| 40-44 | 68.1 | 24.7 | 23.5 | 35 |
| 45-49 | 19.0 | 5.7 | 4.8 | 25 |

² Figures supplied in a communication from the Central Statistical Office of the USSR.

Statistics on the birth rate for the constituent Republics of the Union, and for urban and rural areas, show that the rural birth rate is still considerably higher than the urban rate, and that comparatively high birth rates persist in many regions of the Soviet Union where the historic background of cultural traditions has been mainly non-European. Studies of fertility trends in other countries which have experienced an inter-penetration of cultures and economic and social changes on a large scale have indicated that, in such situations, a continued decline in fertility can ordinarily be expected in areas where it is still comparatively high, even though fertility may decrease no further where it is already low. These observations suggest that some further drop in the average fertility level of the entire Soviet Union may still occur, but the decrease is not likely to be rapid nor to continue over a very extended future period. Under conditions of increased economic well-being, a moderate rise in fertility, such as had recently occurred in Western Europe and the United States, is also among the possible expectations.

The large reduction in the birth rates of older women since the pre-war years may be due partly to the large loss of men's lives during the war, which meant that many women in these age groups were widowed and others experienced difficulty in getting married in the post-war period. With the rise of the new generations, however, the number of men in relation to the number of women in the marriageable age groups tends to be normalized, and the proportion of women in the reproductive age groups who are married is likely to rise. Thus, the declining trend of age-specific birth rates for women in some of the older age groups may be halted or possibly reversed for a time in the future.

Although it is customary to calculate fertility rates in relation to the female population, calculations can also be related to males at ages of potential fatherhood. Such a calculation shows a considerable decline in men's fertility between the years 1950 and 1960.³ The fertility of men was comparatively high when the shortage of young men was most severe and tended to fall as the rise of new generations reduced that relative shortage. It is unlikely that the decrease of fertility calculated in relation to men indicates the probable future trend. More likely, male fertility will decline only gradually, if at all, up to a time when the deficient older generation has been entirely replaced at the ages of potential fatherhood by a younger generation in which the numbers of men and women are balanced.⁴

³ In these calculations, it was assumed that the age-specific fertility rates of men in the Soviet Union were distributed like those of men in Poland, according to Polish statistics for recent years. In the case of women, available statistics show that, in fact, the distribution of age-specific fertility rates in Poland closely resembles that in the Soviet Union. By "reverse-survival" of the 1960 population by sex and age groups (estimated with some adjustments of census data for 1959), numbers of men and women of ages of potential parenthood were calculated for 1955 and for 1950, and the numbers of births in those years were related to them. The calculation showed the following indices of male and female fertility in 1950 and 1955, in proportion to the 1960 rates equated to 100:

| Fertility calculated in relation to: | 1950 | 1955 | 1960 |
|--------------------------------------|-------|-------|-------|
| Men | 125.1 | 108.8 | 100.0 |
| Women | 96.2 | 97.4 | 100.0 |

⁴ The disproportion between the sexes at young adult ages was still considerable at the time of the 1959 census. A comparison with data of

TABLE 13.3
Population projection for the USSR, urban and rural areas, 1960-1980^a

| | 1960 | 1965 | 1970 | 1975 | 1980 |
|---|-------|-------|-------|-------|-------|
| <i>Population (millions)</i> | | | | | |
| Total population | 214.4 | 231.0 | 245.7 | 260.8 | 277.8 |
| Urban population | 106.0 | 122.8 | 140.5 | 161.0 | 186.3 |
| Rural population | 108.4 | 108.2 | 105.2 | 99.8 | 91.5 |
| <i>Quinquennial increase (per cent)</i> | | | | | |
| Total population | | 7.7 | 6.4 | 6.2 | 6.5 |
| Urban population | | 15.9 | 14.3 | 14.6 | 15.7 |

^a Official projection adjusted to mid-year dates.

A very decided decrease of death risks towards the lowest levels reached elsewhere in the world can be noted in the USSR during the 1950's. According to the official life table, an expectation of life at birth of 69 years (both sexes) was attained in 1958-1959. This may be compared with 44 years according to official data of 1926-1927. After 1959, there was a significant fall in the infant mortality rate to the level of 30 per 1,000 in 1963; therefore, it is likely that expectation of life at birth approached 70 years in 1963. As this approximates some of the lowest levels of mortality recorded elsewhere in the world, the scope for further reductions in death risks now has to be regarded as much more limited than it was before. With an increasing proportion of aged persons in the population, the crude death rate may eventually begin to rise, even though mortality rates at each age decrease further.

3. PROJECTIONS

The Central Statistical Office of the USSR had calculated population projections by complex methods, taking into account regional, urban and rural levels and trends in age-specific rates of fertility and mortality, the increasing urbanization of each region and migration between regions of the country. Results were thus obtained for urban and rural areas of each constituent Republic as well as for the Soviet Union as a whole. Calculations had been made according to a number of variants in the assumptions.

In this connexion, it is worth noting how fast urbanization has progressed in the Soviet Union. The percentage of population in urban areas, according to the censuses, was 18 in 1926, 33 in 1939, and 48 within the larger territory of the Soviet Union in 1959. More than half of the country's inhabitants resided in urban areas in 1961. In the variant projection considered as most likely, the proportion of urban population would rise to about 58 per cent by 1970, and 68 per cent by 1980. A large migration from rural to urban areas is implied as well as a shift of localities from rural to urban status. Fertility being lower in urban than in rural areas, one of the consequences would be a tendency towards a moderate decrease in the national

average level of fertility. This result was obtained in the projections for the entire country even though rises in fertility were assumed in some areas. Some further decreases in mortality, particularly of infants, were also assumed. The projected population figures for urban and rural areas are shown in table 13.3,³ and the corresponding totals for the whole country are reproduced in annex 3, table A3.8.

For the "high", "low" and "medium" variants, mortality was assumed to decrease further until the expectation of life at birth would reach 73.9 years; in view of recently observed levels, this value would be reached towards 1975.

In the case of fertility, three alternative assumptions were taken into consideration. An appreciable rise in fertility occurred in the 1950's in parts of Europe, Northern America, Australia and New Zealand, though birth rates were low there in the 1930's. The fertility of women in the Soviet Union may undergo a similar rise, even though present indications of this are few and the basis for such an analogy is tenuous. For the "high" variant, therefore, the sex-age adjusted birth rate, calculated as 22.0 per 1,000 for 1960, was allowed to rise to 25.0 per 1,000 by 1970 and remain at that level thereafter.

The "low" variant took account of the closer cultural affinity with countries of Eastern Europe, where fertility was still comparatively high in the 1930's but is now generally much lower than in the Soviet Union. From this point of view, it does not appear implausible that fertility in the Soviet Union might decrease considerably in the near future. It was assumed for the "low" variant that the sex-age adjusted birth rate would fall to 18.0 per 1,000 as soon as 1965 and then remain at that level.

For the "medium" variant, fertility was assumed to undergo some decrease and then recover again so that, from 1980 onward, a sex-age adjusted birth rate of 22.0 per 1,000 would be maintained, equal to the level estimated for the year 1960. This possible future course, at least up to 1980, appeared to be suggested in the results of the projection calculated with more complex methods by the Central Statistical Office of the Soviet Union, which is shown in

the 1939 census is pertinent. Of 1,000 men aged 16 years and over, 690 were married in 1939, and 695 in 1959, but of 1,000 women aged 16 years and over, 605 were married in 1939, and only 522 in 1959 (data according to P. G. Podyachikh, *Naselenie SSR* (Moscow, 1961), p. 26).

³ In the original, the projection was calculated for end-year dates. The results of total and urban population have been adjusted by multiplying them by the ratio of the mid-year-1960 to the end-1960 population estimate, the rural population having been obtained by subtraction.

table 13.3.⁶ An extension of that projection, on the simplified assumption that fertility would remain constant after 1980, was considered as a logical sequel.

The long-range projections resulting from the above assumptions, and the corresponding decennial rates of

Actually, the "medium" variant was calculated through the period up to 1980 by assuming the same increase of population shown by the projection made by the Central Statistical Office. This is nearly equivalent to assuming the same trend of fertility in terms of the simplified measure, since the mortality assumption is closely similar. The sex-age adjusted birth rates corresponding to the available projection were found to be 20.3 per 1,000 in 1960-1965, 19.6 in 1965-1970, 20.4 in 1970-1975, and 21.1 in 1975-1980. This trend suggests possible stabilization at a level of about 22.0 after 1980.

population increase, are shown in tables A3.2 to A3.4, A3.6 and A3.7 of annex 3.

On the "high" assumption, the population would increase by about 88 per cent up to the year 2000. The rate of population growth would diminish rapidly should the fertility of women decrease as on the "low" assumption. The rate of growth would slacken, more at first but less later on, if population should increase in accordance with the "medium" variant. While the sex ratio in reproductive ages improves, the latter variant implies an appreciable decrease in the fertility of married women within the next few years.

Chapter 14 AFRICA

Though demographic information concerning Africa has recently been much improved, it is still only approximate for most countries comprising this continent and quite sketchy for some. Data for Northern and Southern Africa are superior, on the whole, to those for the inter-tropical regions, as relatively reliable methods of enumeration have been used more widely there and over a more extended period of time. Though this difference is a matter of degree, it was considered preferable to devise different criteria in developing population estimates and projections for the several regions.

A. WESTERN, EASTERN AND MIDDLE AFRICA

1. Population growth, 1920-1960

In these three parts of Africa, population has unquestionably been increasing and the rates of increase have probably been accelerating, particularly in recent years. While there can be little doubt about these broad features in the regional demographic trends, it is difficult to substantiate them with securely based data. The population data furnished for countries in this region, either continuously or from time to time, suggest very slow increases in the 1920's and 1930's followed by sudden and unprecedented augmentations in more recent years. The abruptness of these changes is too implausible to be accepted.

An exhaustive search of all sources of information pertinent to evaluation of the accuracy of the data was beyond the scope of the present study. Even if it had been feasible to carry out such intensive research, it is uncertain whether a much more trustworthy series of past population estimates could have been constructed. In view of frequent revisions of official data, many of the figures shown here may soon be out of date.

Censuses and country-wide surveys of a modern type have been carried out only in recent years in most countries of tropical Africa though in many of them less reliable enumerations by diverse procedures were made in previous decades. The resulting information is briefly summarized below for some selected larger countries.

In *Nigeria*, an enumeration in 1921 found a population of 18,330,000 and another in 1931 resulted in a figure only about 6 per cent larger. Low rates of population increase were assumed in the official series of annual population estimates up to 1941, when the estimated total was 20.2 million. In 1951, the population estimate was put at the rounded figure of 25 million. This figure was substantially surpassed by the census of 1952-1953, in which 30.4 million inhabitants were enumerated. With that figure as

a bench-mark and an assumption that the population was growing annually by 1.9 per cent, the official series of annual population estimates brought the total to 35.1 million by mid-year 1960 and 37.2 million by 1963. However, an examination of age data obtained in the 1952-1953 census shows very high fertility and suggests that both the 1952-1953 census total and the rate of increase had been considerably underestimated. The census taken in 1963 gave a provisional population figure of 55.7 million, subject to modification on the basis of official checks. Although it is possible that this figure is too high, its order of magnitude implies that the population was considerably understated at the 1952-1953 census. Even by assuming a very high rate of growth, such a figure for 1963 cannot be reconciled with the number enumerated in 1952-1953 and its consistency with earlier figures back to 1921 is dubious.

In *Ethiopia*, no census has ever been taken but population estimates for some portions of the country, based apparently on local administrative reports, have been cited in a few sources. Over a long period of years, the *League of Nations Statistical Yearbooks* maintained the round figure of 10 million as an estimate of the population of the country, not including Eritrea. According to G. K. Rein, detailed local data permitted an assessment of the population between 10 and 12 million about 1920,¹ and an estimate of 15 million by A. Zervos was published in 1935.² By contrast, using circumstantial data, R. Almagià arrived at an estimate of only 6 to 7 million in 1936,³ and similarly low figures were also estimated by others about that time. In 1940-1945, when first-hand information was unobtainable, conjectured figures of population between 8 and 10 million were cited in several sources.⁴ The Government of Ethiopia estimated the population at 15 million in 1946 and retained this figure at least until 1951 (though it was exceptionally raised to 16.7 million in 1949).⁵ Beginning in 1955, the Government estimated the population at 20 million, a figure also reported for 1960, though somewhat higher estimates were suggested in 1958 (21.6 million) and 1959 (21.8 million).⁶ Independent sources confirm that relatively up-to-date population estimates exist in various

¹ G. K. Rein, *Abessinien*, vol. III (Berlin, 1920), p. 15.

² A. Zervos, *L'Empire d'Ethiopie* (Athens, 1935).

³ R. Almagià, *Africa Orientale* (Bologna, Reale Società Geografica Italiana, 1936).

⁴ *League of Nations Statistical Yearbook, 1940-1941*; A. Maisel, *Africa* (New York, 1943); C. Wells, *Introducing Africa* (New York, 1944); and various encyclopedia articles appearing at that time.

⁵ In these and preceding years, Ethiopia did not include Eritrea, which was then a separate territory with a population estimated in the order of 1 million.

⁶ Including Eritrea.

parts of the country and that they appear to be consistent with a population total of 20 million, and possibly more for the entire country.

In *Ghana*, the 1921 enumeration resulted in 2.3 million but was judged defective, whereas a total of 3.2 million was obtained at the 1931 census,⁷ and 4.1 million at the census of 1948. The series of official annual population estimates, rising from 3.7 million in 1940 to 4.9 million in 1959, implied an annual rate of increase of 1.5 to 1.6 per cent, but a population total of 6.7 million was obtained in the census of 1960. Unless this is exaggerated, it implies a much higher rate of increase and also probably incomplete enumeration in the 1948 census and earlier counts. According to one estimate, under-enumeration in 1948 may have been of the order of 10 per cent; if this is accepted, and the 1960 census total is taken to be accurate, the average annual population increase rate was 3.3 per cent during 1948-1960; but the calculation is not on a solid basis. The official population estimates for the years 1960 to 1962 imply an annual increase of 2.7 per cent.

In *Upper Volta*, the population was estimated at 3,081,000 in 1921 and at 3,001,000 in 1931, implying a slight decrease. The series of annual official estimates for the 1930's and 1940's, so far as available, imply annual increases at rates between 1 and 2 per cent, and by 1959 the estimate was put at 3,635,000. A population total of 4.4 million, however, was obtained from a sample survey in 1961.

In *Guinea*, population estimates compiled from administrative reports totalled 1.9 million in 1921, 2.2 million in 1931, but only 2.1 million in 1940. For the years 1950-1953 the population figure was put at 2.2 million, and then raised to 2.5 million in 1954, roughly in accord with the 2,570,000 determined in the sample survey of 1955. Official estimates of 3,072,000 in 1960 and 3,357,000 in 1963 imply population growth at the high rate of 3.0 per cent per year since 1955, a marked contrast with the low rates implied by the earlier population estimates.

In *Kenya*, enumerations have been carried out repeatedly since 1911, at which date a population total of 2,835,000 was found. Totals of 2.6, 2.7 and 3.0 million were obtained in 1921, 1926 and 1931. In 1926-1931, if the figures for those two dates were accurate, the increase was at an annual rate of 2.5 per cent. Only slight changes were implied in official population estimates for 1930-1935, whereas very large increases appeared in the annual estimates for 1936-1944. By 1947, the population was estimated to have increased to 4.2 million, but the census of 1948 recorded a total of 5.2 million, showing that either the enumerations of 1921-1931 or the previously estimated rates of increase, if not both, had been understated. For the years 1946-1961, the annual population estimates reflected a rate of growth of 2.4 per cent per annum, the estimated population in 1961 amounting to 7.3 million, but even this series of estimates is too low when judged by the result of the 1962 census, which showed a total of 8,676,000.

In *Zambia*, the bench-mark estimates of 983,000 in 1921 and 1,345,000 in 1931 imply a very high rate of increase

though not impossible if there was much immigration at that time. Very little increase is implied in the official estimates for years from 1931 to 1936, and widely varying rates in the annual series extended to 1960, in which the results of the 1950 sample survey, yielding a population total of 1.8 million, were taken into account. The continuation of this series implying rapid recent increases resulted in an estimate of 2,550,000 in 1962. However, the 1963 census of the African population obtained a total of 3.4 million, and estimates for recent years have been re-computed in view of that result. Although the population of Zambia may have actually been growing with outstanding rapidity, partly as a result of immigration, it is probable that during long past periods it was substantially underestimated.

In *Mozambique*, censuses were taken in 1940, 1950 and 1960. Earlier population estimates, 4.2 million in 1932 and 4.9 million in 1939, implied a considerable rate of population growth but were not definitely inconsistent with the 1940 census total of 5,086,000. In 1950, a population of 5,739,000 was enumerated, and in 1960, 6,579,000, suggesting that after 1940, population growth slackened to a more moderate pace. It is possible that, as a result of emigration from Mozambique, the population grew less rapidly in the 1940's and 1950's than in the 1930's. On the other hand, the most recent official population estimates, 1960-1962, again suggest a high rate of increase, 2.4 per cent per year.

In *Angola*, the series of official population estimates prior to 1940 includes 3.1 million in 1920, 3.3 million in 1930, a decrease to 2.6 million in 1937, and rapid upward adjustments to 2.8 million in 1938 and 3.2 million in 1939. The 1940 census gave a total of 3,738,000, consistent with the population estimates made in 1920 and 1930 and moderate rates of increase, but inconsistent with the decreases implied by the estimates between 1930 and 1937. Moderate increases were implied also in official estimates subsequent to 1940, and these were confirmed when the 1950 census enumerated 4,145,000 inhabitants. The census of 1960, totalling 4,833,000 is consistent with some recent acceleration in the rate of increase.

Although other examples could be cited, the data summarized above suffice to indicate the wide diversity in the nature and presumable quality of demographic information for tropical African countries during past decades. Concerning the actual past population trends no definitive conclusions can be arrived at without deep comparative study of administrative documents and scholarly reports. Surveys of administrative reports bearing on population estimates for periods up to 1948 in some of the African territories express profound discouragement with the implementation of the procedures of data collection then prescribed.⁸ Tentatively, from a brief survey such as made here, it is concluded that the quality of demographic data probably improved in some countries to an undetermined extent and deteriorated in others in the course of the 1920's, 1930's and the earlier part of the 1940's and that the

⁷ The 1921 and 1931 data exclude the population of former British Togo, with 383,000 inhabitants according to the census of 1948.

⁸ Notably R. R. Kuczynski, *Demographic Survey of the British Colonial Empire*, vol. I: *West Africa*, and vol. II: *East Africa* (London, 1948 and 1949). The systems of data collection and methods of estimation in areas then administered by other European Powers varied and have been commented on in numerous other sources.

TABLE 14.1

Population of Western, Eastern and Middle Africa, 1920-1950 as estimated in 1952, and hypothetical projections of the population of the three regions from 1960 back to 1920

| Region | 1920 | 1930 | 1940 | 1950 | 1960 |
|---|------|-------|-------|-------|--------------------|
| A. ESTIMATES AS CALCULATED IN 1952 | | | | | |
| <i>Population (millions)</i> | | | | | |
| Tropical Africa | 97.0 | 106.3 | 116.8 | 132.4 | 189.3 ^a |
| Western Africa | 38.2 | 43.0 | 48.2 | 55.3 | 86.0 ^a |
| Eastern Africa | 39.0 | 42.6 | 46.5 | 52.8 | 75.0 ^a |
| Middle Africa | 19.8 | 20.7 | 22.1 | 24.3 | 28.3 ^a |
| <i>Implied increase per decade (per cent)</i> | | | | | |
| Tropical Africa | | 9.7 | 9.9 | 13.4 | 42.9 ^b |
| Western Africa | | 12.6 | 12.1 | 14.7 | 55.4 ^b |
| Eastern Africa | | 9.2 | 9.1 | 13.6 | 42.0 ^b |
| Middle Africa | | 4.9 | 6.8 | 9.9 | 16.3 ^b |
| B. HYPOTHETICAL ESTIMATES PROJECTED BACKWARD FROM DATA FOR 1960 | | | | | |
| <i>Population (millions)</i> | | | | | |
| Tropical Africa | 96.8 | 111.6 | 131.1 | 155.3 | 189.3 |
| Western Africa | 36.6 | 44.3 | 54.5 | 67.5 | 86.0 |
| Eastern Africa | 41.1 | 46.7 | 54.0 | 62.8 | 75.0 |
| Middle Africa | 19.1 | 20.6 | 22.6 | 25.0 | 28.3 |
| <i>Implied increase per decade (per cent)</i> | | | | | |
| Tropical Africa | | 15.2 | 17.6 | 18.5 | 21.8 |
| Western Africa | | 20.8 | 23.2 | 23.9 | 27.3 |
| Eastern Africa | | 13.6 | 15.7 | 16.4 | 19.4 |
| Middle Africa | | 7.8 | 9.8 | 10.4 | 13.3 |

^a According to current estimates.

^b Increase from previously calculated estimate for 1950 to current estimate for 1960.

general level of quality throughout this period was low, save in some minor and exceptional areas.

From 1948 onward, there was a decided improvement in technical standards and an increase in resources devoted to the collection of demographic statistics in many tropical African countries. Censuses and surveys undertaken around 1950 yielded population figures which, generally speaking, were considerably larger, than the current estimates then available. Those data appeared to give good reason for upward revision of population estimates for earlier years, but official series extending backward over a considerable number of years and consistent with recent data became available only in rare instances.

New censuses and surveys undertaken later in the 1950's and since 1960 again often showed totals surpassing current estimates, even where the estimates had already been revised upward in view of the results of a census or survey taken only a few years previously. With the increased experience and adaptation of modern techniques to African conditions, improvements in means of communication, and the far greater analytic detail in the information collected, it can be assumed that, on the whole, recent data are likely to be more accurate than all preceding ones. The recent data suggest that population has been growing much more rapidly than was previously assumed, but the improvements in data have been far from uniform and it is also possible that some of the recent enumerations overshoot the target.

Some upward revisions of previous population estimates for African countries were made by the United Nations Secretariat in 1952, retaining, in most instances, the previously estimated low rates of population growth.⁹ Regional totals as then estimated for 1920 to 1950 are shown in table 14.1 and few further revisions have been made in the figures since then. Since the most recent population estimates for many of those countries greatly exceed all previous figures, and since such a sudden acceleration of population growth could hardly have happened, the inconsistency of the earlier series of estimates up to 1950 with data now available for 1960 is obvious and a new revision of the past figures is strongly indicated.

Also shown in table 14.1 are hypothetical estimates of past population in the same regions of Africa obtained by projecting backward from the current regional data or estimates on the size, fertility, mortality and age composition of the population.¹⁰ The assumptions made for the projection are dubious, nor is it certain that the recent

⁹ These revisions were not intended primarily to establish figures for individual countries (for which the margin of error would inevitably have been wide), but mainly to arrive at the best possible estimates of regional population totals that appeared possible in the circumstances. Such regional totals were published in successive issues of the United Nations *Demographic Yearbook* (table 1-a in issues for 1952 to 1954, and table 2 in all subsequent issues).

¹⁰ The estimates of population, size and recent or current fertility and mortality are described in the following pages. Age composition corresponding to the estimated levels of fertility and mortality was estimated in accordance with the corresponding set of population models.

estimates from which the projection started are accurate. It was assumed that fertility as estimated about 1960 in each region had not changed since an indefinite past and that expectation of life rose linearly from 27.5 years in 1920 to 31.5 years in 1936, remained at that level until 1948, and then rose more rapidly to 37.5 years in 1960, in each region. While these assumptions appear plausible, in view of known circumstances, the estimates so obtained can only be regarded as hypothetical. They may approximate the facts somewhat more closely than did the estimates made in 1952.

The backward projected estimates and those calculated in 1952 on the basis of upward revisions of previous estimates are not far apart as regards regional population totals in 1920; but this agreement gives little cause for supposing that the estimates for 1920 are accurate. The results of the hypothetical projection are more plausible than the earlier estimates for intervening years, as the gradually increasing speed of growth assumed for the projection is a more plausible trend.

The estimates for Western, Eastern and Middle Africa adopted provisionally for the present purpose, for the period 1920 to 1960 are shown in table A3.8 of annex 3. Since both sets of estimates shown in table 14.1 were clearly very weak and only a provisional revision of earlier estimates was aimed at, the figures were rounded, especially for 1920 and 1950. No inferences can be drawn from these figures in view of their insecure basis. Comparison of the figures for successive dates merely reflects the assumptions made in constructing them.

2. Fertility

It has been determined that fertility in these three regions of Africa is high, but not uniformly high. The reasons for differences in the fertility level among and within these regions are not well known, nor is it certain that they have a permanent character. Data on age composition of the population in large parts of Africa have so far been obtained mostly by very broad age groups only and, where more detailed data have been furnished, they are obviously affected by considerable inaccuracy. In the absence of reliable vital statistics registration—with the exception of some comparatively small and unrepresentative areas—there is no assurance that fertility levels such as those for recent dates have prevailed over long past periods. In fact, very high fertility in some parts of tropical Africa, and only moderately high fertility in others, may be a temporary condition. Detribalization, the earning of cash incomes and other modern changes which entail some social re-orientation are among the factors which might have augmented, temporarily at least, an already high level of fertility. At the same time, venereal and other diseases, and traditional restraints on marriage and fertility, may have kept fertility hitherto below the level which it would otherwise have reached. In either event, though the factors are not known in detail, there is a possibility that the present level of fertility may change in the course of time, although there are few reasons, at the moment for anticipating an early decline to the levels now prevailing in industrialized countries. Declines of the latter kind may begin among urbanized minorities without having any

appreciable effect on the regional averages for some time to come.

The gross reproduction rate was estimated as 3.5 for Western Africa, 2.9 for Eastern Africa, and 2.5 for Middle Africa. These are weighted averages of gross reproduction rates calculated for some of the principal countries, which were as follows:¹¹

Western Africa: 3.7 for Nigeria; 3.5 for Niger, Mali and Guinea; 3.3 for Togo; 3.1 for Upper Volta; 3.0 for Ghana and the Ivory Coast, 2.9 for Dahomey.

Eastern Africa: 3.5 for Zambia;¹² 3.3 for Rwanda; 3.2 for Kenya; 3.1 for Southern Rhodesia; 2.8 for Tanganyika;¹³ 2.6 for Uganda, Mozambique and Burundi; 2.4 for Madagascar.

Middle Africa: 2.7 for Angola; 2.4 for the Democratic Republic of the Congo and the Central African Republic; 2.3 for Cameroon.

The data include the great majority of the population of each of the three regions, except Ethiopia and Somalia, whose share in the population of Eastern Africa is considerable. Though fertility in Ethiopia and Somalia has not yet been determined, it is probably rather high; therefore, the average for Eastern Africa, which would be 2.8 from the available data, was raised to 2.9, which is probably more nearly representative for the region as a whole.

For the reasons indicated and also because of possible errors in the current estimates, the variant projections, other than that of "constant fertility, no migration", did not assume that fertility would necessarily be maintained at the currently estimated levels. Social change is likely to be quickened in Africa during the decades to come, with unpredictable effects on the fertility level. It was not assumed, however, that a decline to much lower fertility would begin within this century in Western, Eastern or Middle Africa. Rather the possibilities envisaged were that in areas where fertility is now extremely high or comparatively low it might change in the direction of an intermediate level within the general range of high fertility.

More accurate birth rates and other fertility measures are furnished by the vital statistics registration data of Mauritius and Réunion. In Mauritius, the crude birth rate, previously fluctuating about 36-37 per 1,000, fell to 30.9 on the average of 1930-1934, then recovered and continued on an upward trend to a peak nearly 50 per 1,000 in 1950. After 1950, the trend again turned downward and most recently it appears to have stabilized near 40 per 1,000. The gross reproduction rate reached the level of about 3.0 by 1950 and has been of the order of 2.7-2.8 since 1958. In Réunion, the trend of the birth rate

¹¹ Data for Niger, Guinea, Upper Volta, and Dahomey according to République gabonaise, Service de Statistique, *Recensement et Enquête démographiques 1960-1961; Résultats provisoires, Ensemble du Gabon* (Paris, May 1963). Mali according to République du Mali, Mission socio-économique, 1956-1958, *Enquête démographique dans le delta central nigérien*, 2^e fascicule, résultats détaillés (Paris, Imprimerie Technigraph). For sources of data for other countries and indications of their reliability, see *Population Bulletin of the United Nations*, No. 7 (Sales No.: 64.XIII.2). Estimates made by the United Nations are derived largely from data on age composition of the population.

¹² Corresponding to a crude birth rate of 56.8 per 1,000, as was estimated for 1950. A high rate of 51 per 1,000 has however been estimated from 1963 census data, hence a recent estimate of GRR should be correspondingly lower.

¹³ Now part of the United Republic of Tanzania.

since 1946 has nearly paralleled that of Mauritius at an even higher level. After rising from 42.4 in 1946-1949 to a peak of 51.3 in 1952, it declined steadily to 43.6 by 1960. In both instances, the temporary rise in fertility has been attributed to effects of suddenly improved health conditions. However, these two islands comprise an insignificant proportion of the population of the three regions and, in view of their peripheral situation, cannot be considered as typical of the conditions now prevailing or likely to arise in the future on the continent.

3. Mortality

At the present level of development of demographic statistics in these three regions of Africa, the measurement of mortality encounters even greater difficulties. Even assuming that fertility may have been ascertained with fair accuracy, rates of population growth cannot be determined accurately enough for a reliable estimate of the death rate as the difference between the birth rate and rate of increase. The surveys which have provided materials for estimation of birth rates and related measures have also been concerned with the measurement of death rates and while they may have been fairly successful in that respect in some instances, the likelihood of omission of a substantial number of deaths is usually greater than that of a comparable number of births.

For each of the three regions, an average expectation of life at birth of approximately 37.5 years was estimated for 1960. The three estimates, which happen to coincide, were based on the following data, allowance being made for some small improvements up to 1960 where the data were not so recent:

Western Africa: 38 years for Ghana (1948), 37 for Senegal (1957), 35 for the Ivory Coast (1956-1958), 33 for Guinea (1954-1955), 32 for Upper Volta (1960-1961), 26 for Mali (1957). To arrive at a regional average for 1960, current mortality in Nigeria was assumed comparable to that in Ghana about 1948.

Eastern Africa: 51 years for Mauritius (1951-1953) and Réunion (1951-1955), 48.5 years for Southern Rhodesia (1953), 45 for Mozambique (1940), 37.5 for Tanganyika (1957), 37 for Zambia (1950), allowance being made in the regional average for probably somewhat higher mortality in Ethiopia.

Middle Africa: 39 years for the Democratic Republic of the Congo (1950-1952), 35 years in Angola (1940), and Central African Republic (1959-1960).

While it can be stated with some assurance that mortality in earlier decades of the century must have been very high, how high it may have been at that time is a sheer matter of guess-work. In addition to the general lack of modern methods of health protection, recurrent internal strife and consequent threats to the food supply probably contributed to high mortality. Internal pacification and gradual extensions of effective central administration may have contributed as much or more to the reduction of mortality in the 1920's and 1930's as efforts in the extension of health services. The mortality assumptions made for the 1960-1920 backward projection represent an attempt to quantify these considerations though very few

data can be found to substantiate the particular conjectures adopted.

The death rates of Mauritius and Réunion (which, as already mentioned, are far from typical of Africa) are well documented. In Mauritius, the crude death rate averaged 31.5 per 1,000 in 1930-1934 and subsided to an average of 25.0 in 1945-1949, then fell sharply to 15.2 in 1950-1954, 12.1 in 1955-1959, and 9.3 in the year 1962. Expectation of life at birth scarcely surpassed thirty years in 1930 but came to exceed fifty years in the 1950's and approached sixty years by 1960. Mortality declined similarly in Réunion, where the crude death rate averaged 23.5 per 1,000 in 1945-1949 and fell to 11.1 by 1960. These small islands present far more favourable conditions for quick and thorough-going application of modern methods in public health than are encountered in most of the remainder of tropical Africa.

The health conditions of large groups of the population of Western, Eastern and Middle Africa could be substantially improved if greater resources were available in trained staff and modern equipment, but such a large-scale mobilization of requisite resources encounters special difficulties in Africa at present. To be sure, measures for sanitation and the control of diseases are now fairly well developed in most of the major urbanized centres of Africa, but the degree of urbanization is still low and even a great success in the reduction of death rates in the cities and towns would reduce the national average mortality levels only to a minor extent. Nevertheless, significant decreases in mortality are to be expected generally, as strong efforts are already being made to promote health education and practices of sanitation.

Social and political change in some of the newly independent countries has been attended by disturbances and insecurity in some areas and there has been some loss of life. The possibilities of strife and its demographic consequences in the future could not be foreseen and were not taken into account in the present assumptions.

The limited knowledge of recent trends and levels of mortality in tropical Africa and the uncertainty as to the possible effectiveness of efforts to improve the conditions make it necessary to adopt diverse assumptions as to future mortality trends. As witnessed in other parts of the world, rapid decreases from an initially high mortality level are possible, and assuming that special obstacles in Africa, such as those arising from difficulties of transport and communication, are successfully overcome, progress may be no slower than the average elsewhere. On this somewhat optimistic assumption, half a year's expectation of life would be gained each year, and the average life expectancy at birth (both sexes), estimated as 37.5 years for 1960, would attain 47.5 years by 1980 and 57.6 years by the end of the century.

On a pessimistic assumption, stubborn geographic, cultural and other obstacles may render such efforts less effective and the pressure of other priorities may prevent very great increases in public health budgets so that the rates of gain in life expectancy for large regions are only half as rapid. From the estimated 37.5 years in 1960, expectation of life would then rise only to 47.5 years by the year 2000.

Since conditions and opportunities in particular areas will probably be diverse, a "medium" assumption is one of the regional expectations of life rising at two-thirds the pace observed elsewhere at comparable levels. It would then attain forty years by 1965-1970, forty-five years by 1980-1985, and fifty years by 1995-2000.

4. Migration

Except for movements from South Africa to Southern Rhodesia and Zambia, from Mozambique to South Africa, and on a smaller scale from Western Africa to the Sudan, there is little evidence that there has been much migration between regions of Africa as defined here. Movements occur on a considerable scale between particular countries such as migration from Upper Volta to Ghana, from Rwanda and Burundi to the United Republic of Tanzania, or from Mozambique and Malawi to Southern Rhodesia and Zambia, but there is a lack of statistics on the magnitude of these movements. The population estimates for individual countries employed such rough methods that separate consideration of the effects of natural increase and migration on population change was not considered necessary.

5. Projections for countries, 1960-1980

Population projections calculated by sex and groups of age were available for the following countries of tropical Africa: the Democratic Republic of the Congo, Tanganyika, Ghana, Mauritius, and the fifteen countries, now independent, which previously were dependencies of France.¹⁴

The projection for the Democratic Republic of the Congo was calculated from an expectation of life (both sexes) averaging thirty-nine years in 1958, assumed to rise by approximately ten years in the course of twenty years, and a gross reproduction rate estimated as 2.05 and assumed either to remain constant or to rise progressively, attaining 3.38 by 1978-1983.¹⁵ The projection for Tanganyika was based on the model of a stable population combining at the outset an expectation of life of 37.5 years and a total fertility rate of 5.6 (gross reproduction rate of about 2.75), fertility being assumed to remain constant while mortality would decline so that expectation of life would attain 45 years by 1970 and 50 years by 1980. The

¹⁴ Marcel Fabri and Jean Mayer, *La population future du Congo perspectives démographiques* (Brussels, Centre d'études des problèmes sociaux et professionnels de la technique, 1959).

J. G. C. Blacker, "The Use of Stable Population Models for the Construction of Population Projections, Application to the African Population of Tanganyika", *International Population Conference, Ottawa, August 21-26, 1963*, op. cit., pp. 65-76.

Projections for Ghana up to 1970 calculated by the Central Bureau of Statistics of Ghana and communicated to the Economic Commission for Africa.

R. M. Titmus and B. Abel-Smith, *Social Policies and Population Growth in Mauritius* (Port Louis, 1960).

Institut national de statistique et des études économiques, Ministère de la coopération, Gouvernement de la France, *Perspectives de population dans les pays africains et malgache d'expression française* (Paris, 1963). The following countries are included: Senegal, Mauritania, Dahomey, Niger, Ivory Coast, Upper Volta, Mali, Guinea, Togo, Cameroon, Gabon, Congo (Brazzaville), the Central African Republic, Chad and Madagascar.

Ministère des finances, Gouvernement de Madagascar, *Essai de prévision de la population malgache* (Tananarive, 1963).

¹⁵ An average of the two assumptions has been adopted for presentation in table A3.8 in annex 3.

projections for Ghana proceeded from two alternative estimates of fertility and mortality levels; in one set, expectation of life was assumed to rise from 35 years in 1960 to 45 years in 1970 while a sex-age adjusted birth rate of 49.6 per 1,000 was maintained; in the other set, expectation of life would rise from 42.5 years to 52 years while the sex-age adjusted birth rate would be 47.3 per 1,000; varying assumptions of the balance of immigration were also made.¹⁶ The projection for Mauritius was calculated with three variants: constant fertility and declining mortality, moderately declining fertility and constant mortality, and rapidly declining fertility with declining mortality; the intermediate combination was selected for the present purpose.

For the fifteen countries which were former dependencies of France, the projections began from population estimates by groups of age and sex as determined in demographic surveys undertaken between 1955 and 1962,¹⁷ adjustments being applied to the age data to partly eliminate the effects of age mis-statement. From divergent estimates of the crude birth rate and the crude death rate obtained by alternative methods of analysis of the data, estimates were selected as follows:

| Country | Birth rate (per 1,000) | Death rate (per 1,000) | Rate of natural increase ^a (per 1,000) |
|------------------------------------|---------------------------|---------------------------|---|
| Mali | 59 | 29 | 30 |
| Madagascar | 46 | 19 | 27 |
| Togo | 55 | 29 | 26 |
| Niger | 53 | 27 | 26 |
| Dahomey | 49 | 23 | 26 |
| Guinea | 55 | 34 | 21 |
| Chad | 48 | 28 | 20 |
| Ivory Coast | 52 | 35 | 17 |
| Upper Volta | 46 | 29 | 17 |
| Senegal | 43 | 26 | 17 |
| Central African Republic | 43 | 29 | 14 |
| Congo (Brazzaville) | 39 | 25 | 14 |
| Cameroon | 40 | 27 | 13 |
| Mauritania | 34 | 26 | 8 |
| Gabon | 31 | 25 | 6 |

^a Implied by difference between birth rate and death rate (not in original source).

In the population projections for these fifteen countries, the levels of fertility estimated for each country in age-specific rates were held constant. With respect to mortality, it was noted that in eleven of the fifteen countries expectation of life at birth could be estimated in the range of 35 to 40 years. For all the projections it was assumed that expectation of life, amounting to 37.5 years in 1960-1964, would rise continuously so as to attain 45 years by 1975-1979.

¹⁶ For the purpose of table A3.8, an average of the two sets of variants was used, together with the assumption of an annual net immigration of 30,000, figures pro-rated to mid-year 1960 and extrapolated to 1980.

¹⁷ 1955 in Guinea; 1957 in Mauritania; 1957-1958 in Ivory Coast; 1957 and 1961 in two provinces of Madagascar; 1959 in the Central African Republic; 1959-1960 in Niger; 1960 in Senegal and Congo (Brazzaville); 1960-1961 in Mali, Upper Volta, and Gabon; 1960-1962 in three regions of Cameroon; 1961 in Dahomey and Togo. At the time of preparation of the present population projections, results of surveys for Senegal, Mali, Niger, Dahomey, the Ivory Coast, Chad, and Congo (Brazzaville) were not yet published.

All the aforementioned projections are included in annex 3, table A3.8, with interpolations and extrapolations for the given dates where needed.¹⁸ They refer to countries containing 37 per cent of the population of Western Africa, 20 per cent of Eastern Africa, 83 per cent of Middle Africa, and 37 per cent of the population of the three regions combined. For the remaining countries, no population projections being available, rough estimates of future population were derived from the "medium" variant of the long-range projections described in the following section.¹⁹

According to the estimates shown in the annex table A3.8, rather unequal rates of population growth can be expected for countries of tropical Africa. Should the estimates prove to be nearly correct, the population of Nigeria, Ghana and Southern Rhodesia would gain by four-fifths or more between 1960 and 1980, and of Kenya, Zambia, Guinea and Mauritius by two-thirds to four-fifths. Increases of one-third or less would occur in Angola, Cameroon, the Central African Republic, Liberia, Congo (Brazzaville), Mauritania and Gabon. The gain in twenty years would be three-quarters in Western Africa, one-half in Eastern Africa and two-fifths in Middle Africa; the three regions combined would experience a population gain of three-fifths. Of course, the information on which the future estimates are based is too sketchy to lend much assurance to such calculations. The margins of uncertainty were felt to be so large that widely differing assumptions should be combined for the purpose of calculating plausible variant for the long-run projections. The regional "medium" projections of the present report, nevertheless, are roughly consistent with projections calculated by other agencies for some of the individual countries. Thus, from 1960 to 1980, the combined population of Ghana, Upper Volta, Mali, the Ivory Coast, Senegal, Guinea, Niger, Dahomey, Togo and Mauritania—for which projections had been calculated individually—might increase by 65 per cent, as compared with 74 per cent according to the "medium" variant for Western Africa (including the fast-growing population of Nigeria). The sum of available projections for Tanganyika, Madagascar and Mauritius shows an increase by 49 per cent up to 1980, as compared with 50 per cent in the "medium" variant for Eastern Africa. The combined projections for the Democratic Republic of the Congo, Cameroon, Chad, the Central African Republic, Congo (Brazzaville) and Gabon suggest a population gain of 44 per cent in the twenty years, as compared with 43 per cent in the "medium" projection for Middle Africa. This approximate agreement does not mean that future population in Africa can be calculated with much

assurance; it merely shows that different agencies interpret similarly the presently known demographic facts. When more facts become known, judgements may have to be revised.

6. Variant and long-range projections

To recapitulate, average expectation of life at birth was estimated at 37.5 years in 1960 for each of the three tropical African regions and the gross reproduction rate at 3.5 in Western Africa, 2.9 in Eastern Africa and 2.5 in Middle Africa. Because current levels and future trends were uncertain both in respect of fertility and mortality, variant projections were drawn up on assumptions in which both factors were varied at the same time. As there have been some indications that the fertility level in tropical Africa might rise with improvements in health, it was not considered illogical to combine a "high" assumption for the future level of fertility with a "low" assumption for mortality, and *vice versa*. Of course, no certainty can be attached to this, and the combinations of assumptions are mostly speculative.

The "high" variant projection for each region assumes a rise in expectation of life from 37.5 years in 1960 to 57.6 years by the year 2000; the "low" variant assumes a much slower rise, expectation of life attaining only 47.5 years by the end of the century; and the "medium" variant assumes that expectation of life rises to 50 years by 1995-2000. Jointly with these varied assumptions with respect to mortality, "high", "low" and "medium" assumptions were drawn up for fertility, and the long-run projections calculated with the extreme combinations so that the "high" projection would show the greatest acceleration of population growth and the "low" projection the least; while in the "medium" variant, "medium" assumptions of mortality and fertility were combined.

The fertility assumptions were drawn up with linear changes from the average levels estimated for 1960 up to 1980 and no further change thereafter. For Western Africa, it was assumed that the gross reproduction rate, 3.5 in 1960, would remain unchanged ("high" assumption), that it would decrease to 3.0 by 1980 ("low"), or that it would decrease to 3.25 by that date ("medium" assumption). For Eastern Africa, where the 1960 estimate of the gross reproduction rate was 2.9, the changes up to 1980 implied in the three assumptions brought it up to 3.25 ("high"), to 3.0 ("medium") or down to 2.75 ("low"). For Middle Africa, the estimated rate in 1960 being 2.5, the three assumptions imply a rise to 3.0 by 1980 ("high" assumption), maintenance of the level of 2.5 ("low") or a more moderate rise to 2.75 ("medium").

The results of the above-stated combinations of assumptions are shown in A3.2 to A3.4 of annex 3. The combined population of the three regions would increase more than three-fold in forty years. Extremely high rates of population increase would result towards the end of the century.

There would be no slow-down of population growth even if the conditions assumed for the "low" variant should prevail in every region. Even in Western Africa, where a considerable decrease of fertility would occur on these assumptions, the assumed slow decreases in mor-

¹⁸ The projection for the Democratic Republic of the Congo was calculated for 1958, 1963 etc., and that for Mauritius for 1962, 1967 etc. In both instances, an interpolation was made for the purpose of the present tables. The projection for Tanganyika was calculated by ten-year periods, and rough interpolations were made to obtain the corresponding estimates in table A 3.8 for 1965 and 1975. The projection for Ghana was extrapolated beyond 1970. The projections for the fifteen countries which were formerly dependencies of France were calculated for 1 January 1960, 1 January 1965 etc., and have been pro-rated so as to agree with mid-year 1960 population estimates.

¹⁹ From estimates for 1950 and 1960, annual rates of increase for individual countries were compared with corresponding rates of increase in the region. It was then assumed that annual rates of increase of individual countries in the future also would differ by the same amounts from regional rates of increase (according to the "medium" regional projections). Because of their uncertainty, the resulting figures for individual countries were rounded.

tality would maintain population growth at a nearly constant rate. The combined population of the three regions would still increase to 2.5 times the 1960 total by the year 2000, the population of Western Africa would triple, that of Middle Africa double and that of Eastern Africa would grow to 2.2 times the initial number.

Finally according to the "medium" variant, the population of tropical Africa would increase almost threefold within the forty years. As with the other variants, the increase would be greatest in Western Africa, intermediate in Eastern Africa and least, though still very considerable, in Middle Africa. These differences among the three regions reflect the wide differences in estimates of the present fertility level. The possibility of divergent future trends is, of course, not precluded. Yet, according to the present calculations, the population of Western Africa would increase at least to 2.9 times its 1960 size by 2000 ("low" variant) while, at the most, the population of Middle Africa would increase 2.6 times ("high" variant). In the absence of unforeseeable changes then, it is probable that future rates of population growth will differ appreciably among the three regions.

B. NORTHERN AFRICA

Censuses have been taken in all countries of this region, and they have been repeated or taken periodically in several. The latest census results are those of 1960 except in the Sudan and Tunisia where they date from 1956 and in Libya from 1954. Vital statistics are registered in most of the larger countries of this region though, on the whole, not yet very accurately. In Tunisia, the registration of births is believed to have become fairly complete, but not that of deaths. Registration is probably quite accurate in Spanish North Africa, but the small population of this area is not representative of any large part of the region.

1. *Population growth, 1920-1960*

The population estimates for the period from 1920 to 1960 shown in annex 3 table A3.8 were taken from official sources with interpolation and extrapolation where a consistent official series covering the entire period was lacking. Those regarded as rather dubious have been greatly rounded.

While allowance must be made for possible errors of estimate, the population of the region appears to have grown by nearly 90 per cent within the past forty years, including an increase of 95 per cent in the United Arab Republic, according to official data, and almost equally large gains in Morocco and Algeria. In Tunisia, the official data show a doubling of the population while in the Sudan and Libya the population may have grown somewhat less. Though several of the estimates for earlier dates may be inaccurate, there is little doubt that population growth in most or all of the region has accelerated, especially in the 1950's.

2. *Fertility and mortality*

Since vital statistics are defective, estimates of the gross reproduction rate for most North African countries have to be calculated from data on age composition of the

population. Except for low rates in Spanish North Africa and among the European minorities elsewhere, closely similar levels are found in the countries in this region. The estimates made from the most recent available data are: 3.0-3.5 in the Sudan, 3.1 in Tunisia, 3.0 in Algeria (Moslems) and Libya, 2.9 in Morocco (Moslems), and 2.8 in the United Arab Republic. For the entire region, the weighted average is about 2.9, corresponding to a crude birth rate of about 45 per 1,000. In Tunisia, a birth rate of 44.4 per 1,000 was registered in 1962, and similar rates in some preceding years.

The lack of reliable vital statistics makes it difficult to estimate the level and trend of mortality with as much assurance, but the indications of large mortality reductions are numerous.

In the United Arab Republic, the recorded death rate averaged 27.1 per 1,000 in 1930-1934, 26.9 in 1935 and 26.8 in 1940-1944, and fell to 23.0 in 1945-1949, 18.7 in 1950-1954, and 17.2 in 1955-1957. Beginning with 1958, the reported data refer to areas with Health Bureaux, where registration is believed to be more accurate than elsewhere, and the death rate registered in these areas fell from 19.3 per 1,000 in 1958 to 15.8 in 1961. Life tables have been calculated by various methods,²⁰ indicating an expectation of life at birth (both sexes) of about 39 years in 1936-1938, 42 years in 1947, and 53 years in 1960. It is not certain that the life tables are strictly comparable, but there is little doubt that the decrease in mortality has been large in the United Arab Republic.

The approximate level of mortality can be calculated, though not reliably, from the difference between estimated birth rates and estimated rates of population growth. For the region as a whole, expectation of life may have averaged about 42.5 years during 1950-1960, which would be consistent with the estimated gross reproduction rate of 2.9 and a population increase of 25 per cent. In view of the continuing mortality reductions during the decade, the regional expectation of life may have attained or surpassed 45 years by 1960.

3. *Projections for countries, 1960-1980*

The population estimates for countries in the North African region up to 1980, shown in annex 3, table A3.8, were derived from the "medium" projection explained in sub-section 4 below. Given the general homogeneity of population trends in these countries, it was assumed that differences in rates of increase observed between individual countries and the regional average in 1950-1960 would persist in future periods of the projection. Estimates obtained by applying these differences to projected future rates of growth in the regional population were rounded. For the Spanish possessions in North-west Africa, roughly constant amounts of future population gain were assumed. The resulting future population estimates are not the equivalent of detailed projections for each country, but they give plausible orders of magnitude consistent with the "medium" variant of the regional projection. According to these estimates, the twenty years' gain in population would be 93 per cent in Morocco, 80

²⁰ *Population Bulletin of the United Nations*, No. 6 (Sales No.: 62.XIII.2), p. 43.

per cent in the United Arab Republic, 77 per cent in Algeria, 64 per cent in the Sudan, and 55 per cent in Tunisia and Libya. It is, of course, far from certain that the 1950-1960 differences in rates of growth will actually persist in the future.

4. *Variant and long-range projections*

It was assumed that the regional average expectation of life, estimated as 45 years shortly before 1960, would continue rising so as to attain 55 years in 1975-1980 and 65.8 years in 1995-2000. Considering the high degree of urbanization already attained and the efforts at industrialization being made in several countries, a very long persistence of fertility as high as in recent years is not probable. Furthermore, the Governments of the United Arab Republic and of Tunisia have recently begun certain activities designed to help parents who so desire to limit the number of births. While the eventual effect of these policies cannot be foreseen, and some rise in fertility may occur in parts of the region as a result of improved conditions of health, a large decrease in fertility is sooner or later to be expected. The date of onset of the decrease was assumed to be 1980 ("high" variant) or 1975 ("medium" variant).

For the "low" variant, a less optimistic mortality assumption was combined with the assumption that the fertility decline would begin in 1970. Given the fact that part of the region's population is in remote areas where public health work is hampered by difficulties of access, it is possible that for a time the average regional expectation of life will rise somewhat more slowly. The assumption made in this respect was a rise in expectation of life to 50 years by 1975-1980 and 60.4 years by 1995-2000.

The various projections of the regional population from 1960 to 2000 are summarized in annex 3, tables A3.2 to A3.4. The increase would be to 3.1 times with late fertility decline, as in the "high" variant, and 2.9 times with earlier fertility decline, as in the "medium" variant. With still earlier fertility decline and slower progress in the reduction of death rates, the forty years' increase would be 2.5-fold ("low" variant).

C. SOUTHERN AFRICA

Censuses have been taken periodically in all areas of this region. Some of the earlier censuses may not have achieved full coverage, but the population trends of the past three decades are well documented. There has been accurate registration of vital statistics for the European minority in South Africa for a long period. For the Coloured minority, consistent registration data have been published since 1937, and for the Asian minority since 1946. Comprehensive vital statistics for the indigenous majority, however, have not yet been established.

1. *Population growth, 1920-1960*

Table A3.8 shows official population estimates for dates from 1920 to 1960, supplemented with interpolations where official data for the particular year were lacking. According to these statistics, the population of South Africa, South West Africa and Swaziland more than doubled in the forty years, while that of Basutoland and Bechuanaland increa-

sed somewhat less. It is possible that population increases in the 1920's were over-estimated owing to incomplete enumeration in the early censuses. The accelerated increase of the 1950's, on the other hand, can be inferred from reliable statistics. The region's population increased by about one-fifth in the 1930's and again in the 1940's, and by more than one-quarter in the 1950's. The lower rates of increase recorded in certain periods in Basutoland, Bechuanaland and Swaziland reflect to a certain extent the effects of emigration to the Republic of South Africa.

2. *Fertility and mortality*

Vital statistics for the European minority of South Africa show birth rates exceeding 30 per 1,000 early in the century and decreasing to near 25 per 1,000 by 1930, a level which has been maintained since then with only small fluctuations. Death rates, previously much higher, decreased to less than 9 per 1,000 in the 1940's; this level has likewise been maintained without any indication of a further decrease. The changes in age composition due to the previously higher birth rate imply that recently there has been a slight rise in the fertility of women of childbearing ages, and that continued decreases in age-specific death rates have maintained a low crude death rate despite the increasing proportion of aged persons. In these respects, the 3 million Europeans of South Africa resemble the population of other countries of European overseas settlement, such as the United States, Argentina and Australia, and similar prospects may be held for the future.

Birth rates averaging between 44 and 48 per 1,000 have been recorded in recent five-year periods for South Africa's Coloured population (a minority totalling about 1.5 million), with little indication of a trend except perhaps a recent slight rise; the crude birth rate recorded in 1960 was 48.4 per 1,000. A continuous decline is noted in recorded death rates for the Coloured population: from an average of 21.3 per 1,000 in 1945-1949, the rate fell to 18.6 in 1950-1954, 16.2 in 1955-1959, and 15.8 per 1,000 in 1960.

For the Asian minority in South Africa, numbering about half a million, decreasing birth rates have been registered, namely 38.5 per 1,000 in 1945-1949, 35.3 in 1950-1954, and 31.5 in 1955-1959, though a rate as high as 35.4 per 1,000 was recorded again in 1960. The tendency up to 1958, when the birth rate was 30.1, suggests that a sharp decrease in fertility was under way, but the recent rise raises doubt as to future trend. The death rates registered for this group of the population, 12.8 per 1,000 in 1945-1949, 9.6 in 1950-1954, 8.4 in 1955-59, and 7.6 in 1960, show a low level and continuing downward trend of mortality.

For the indigenous majority of this region's population, no vital statistics are available, and estimates of fertility and mortality depend on the method of "reverse-survival" from the census age distribution. The most recent data yielded an estimate of the gross reproduction rate of 3.0 in 1950-1955, which may be compared with 1.8 for Europeans, 3.2 for Coloured, and 2.2 for Asians as of 1960. With much less assurance, average expectation of life at birth (both sexes) of the indigenous population during

1951-1960 was assessed as about 40 years, in view of the inter-censal rate of increase and estimated fertility, but this estimate may be inaccurate as immigration from neighbouring areas has made a contribution of unknown magnitude to the rate of increase. The estimate of 40 years for the indigenous population may be compared with expectations of life, according to 1950-1953 life tables, of 67 years for Europeans, 46 years for Coloured, and 55 years for Asians, and higher expectations more recently in view of the recent decreases in the death rates.

Allowing for decreases in mortality in recent years, and assuming that the fertility of the indigenous population has not undergone a significant change, the average expectation of life in the region may have risen to about 46 years by 1960, when the gross reproduction rate would have averaged about 2.8.²¹

3. Projections for countries, 1960-1980

The Republic of South Africa contains nearly nine-tenths of the population in the Southern African region and has received many migrants from adjacent areas. As the future numbers of migrants were difficult to foresee, it appeared satisfactory to derive future population estimates for the separate areas from the "medium" variant of the regional projection. As in the case of Northern Africa, the method adopted was to assume that differences between rates of growth in the separate areas as observed in 1950-1960 would persist in the future, which is, of course, uncertain. As no precise significance could be attached to these estimates, the figures were rounded, with results as shown in table A3.8, annex 3. The figures

²¹ A gross reproduction rate of 2.4 has been estimated for Basutoland and 2.7 for Bechuanaland. These comparatively low levels may be in part a consequence of large emigration of young men.

suggest an increase in regional population by two-thirds within twenty years, and as large or larger increases in South Africa, South West Africa and Swaziland, whereas in Basutoland and Bechuanaland the population would grow slowly according to the assumption.

4. Variant and long-range projections for Southern Africa

In formulating assumptions for the "high", "low" and "medium" variants, it was considered that the future course of social change in this region was now hardly foreseeable and might be unique. Reduced interaction among ethnic groups might impede rapid propagation of habits and attitudes among the indigenous population conducive to low mortality or to an eventual decline of fertility.

For a "high" variant, it was thought pertinent to combine an assumption of continued rapid mortality decline with no decline of fertility before the end of the century, in other words, the estimates of the gross reproduction rate of 2.8 is assumed to remain constant, and the expectation of life, which was about 46 years in 1960, would rise to 55 years by 1975-1980 and 65.8 years by 1995-2000.

For the "low" variant, initially slower mortality decline was combined with the assumption that a decisive fertility decline would begin in 1975. The assumed mortality decline is such that expectation of life rises to 50 years in 1975-1980 and to 60.4 years in 1995-2000.

For the "medium" variant, the assumption as regards expectation of life is the same as for the "low" variant but it is assumed that the decisive fertility decline will not set in until 1985. It cannot be stated that this particular combination of assumption has greater likelihood than any other, but the intermediate rate of population growth so obtained is perhaps more plausible than the rates shown by the "high" and "low" variants. The results of the several variants are shown in tables A3.2 to A3.4, annex 3.

Chapter 15 NORTHERN AMERICA

As defined for purposes of this report, this region comprises the United States, Canada, Bermuda, Greenland, and St. Pierre and Miquelon. The United States includes Alaska and Hawaii, two former Territories that became States of the Union in 1959 and 1960, respectively.

1. POPULATION GROWTH, 1920-1960

From initially small numbers, the population of this region grew prodigiously in the nineteenth century. It was still increasing at a substantial rate in the 1920's. The rate of growth fell to a record low in the 1930's, recovered in the 1940's and rose higher again in the 1950's (see table A3.8). In each decade since 1920, the population of Canada grew faster than that of the United States so that, in the forty-year period, Canada's population doubled while in the United States the increase was about two-thirds. Variations in the rates of growth reflect changes in the birth rate and also in the migratory balance. Immigration, previously large, virtually disappeared in the 1930's but again became substantial after the Second World War. The effects of international migration on population growth in this region, however, are now proportionately

smaller than they were early in the century, when the regional population was much smaller.

2. FERTILITY AND MORTALITY

Table 15.1 shows trends in birth rates, death rates and rates of natural increase for the United States and Canada. In both countries, registration was not quite complete in the 1920's, but it improved and has since then become substantially accurate.¹ Up to 1933, the data for the United States were for an expanding registration area; since that date they have covered the entire population of the country except Alaska, which was included only from 1950 onwards. The rates for Canada have been calculated so as to include Newfoundland, Yukon and the North-east Territories at all dates.

¹ Birth rates including adjustment for incomplete registration and for States not in the registration area have been published in Department of Health, Education and Welfare, Government of the United States, *Vital Statistics of the United States, 1960*, vol. I, *Natality*. The adjusted rates are higher than those shown here as recorded in the registration area, the difference being appreciable in the 1920's but diminishing progressively and becoming negligible in recent years.

TABLE 15.1
Crude birth rates, death rates and rates of natural increase
in the United States and Canada, 1920-1962
Per 1,000 population

| Period | Birth rate | | Death rate | | Rate of natural increase | |
|---------------------|----------------------------|-------------------|----------------------------|-------------------|----------------------------|-------------------|
| | United States ^a | Canada | United States ^a | Canada | United States ^a | Canada |
| 1920-1924 | 22.8 | 26.7 ^b | 12.0 | 10.9 ^b | 10.8 | 15.8 ^b |
| 1925-1929 | 20.1 | 24.5 | 11.8 | 11.2 | 8.3 | 13.3 |
| 1930-1934 | 17.6 | 22.2 | 11.0 | 10.0 | 6.6 | 12.2 |
| 1935-1939 | 17.2 | 20.4 | 11.0 | 9.9 | 6.2 | 10.5 |
| 1940-1945 | 19.9 | 23.2 | 10.6 | 9.9 | 9.3 | 13.3 |
| 1945-1949 | 23.4 | 27.0 | 10.0 | 9.4 | 13.4 | 17.6 |
| 1950-1954 | 24.4 | 27.8 | 9.5 | 8.7 | 15.0 | 19.1 |
| 1955-1959 | 24.6 | 27.9 | 9.4 | 8.1 | 15.2 | 19.8 |
| 1955 | 24.7 | 28.2 | 9.3 | 8.2 | 15.4 | 20.0 |
| 1956 | 24.9 | 28.0 | 9.3 | 8.2 | 15.6 | 19.8 |
| 1957 | 25.0 | 28.1 | 9.6 | 8.2 | 15.4 | 19.9 |
| 1958 | 24.3 | 27.5 | 9.5 | 7.9 | 14.8 | 19.6 |
| 1959 | 24.1 | 27.4 | 9.4 | 8.0 | 14.7 | 19.4 |
| 1960 | 23.7 | 26.7 | 9.5 | 7.8 | 14.2 | 18.9 |
| 1961 | 23.3 | 26.0 | 9.3 | 7.7 | 14.0 | 18.3 |
| 1962 | 22.4 | 25.5 | 9.5 | 7.6 | 12.9 | 17.9 |

^a Rates recorded in expanding registration area comprising the whole country except Alaska by 1933, including also Alaska from 1950 onward.

^b 1924 only.

In both countries, the crude birth rates decreased considerably in the 1920's and 1930's, and rose sharply from 1945 onward to a level which was maintained with little change from 1947 until about 1957; a slight decrease began then which has become more noticeable since 1960. In every period, the birth rate in Canada was about three to five points above that in the United States. The death rates in both countries decreased fairly consistently, the rate in Canada being slightly below that in the United States. In the United States the decrease in the crude death rate has virtually halted, while in Canada it was still continuing in the most recent years. With comparable birth rates and lower death rates, natural increase is higher now than it was in 1920-1924; and changes in the two countries were nearly parallel so that, in each period, the rate of natural increase in Canada exceeded that in the United States by four to six points. As the decline in the death rate has slowed down and birth rates are decreasing, the rates of natural increase in both countries have recently diminished somewhat.

Owing to modifications in age composition, the trend in the crude birth rate does not reflect very clearly the changes in the fertility of women at reproductive ages. The gross reproduction rate in the United States decreased from more than 1.4 early in the 1920's to scarcely 1.0 early in the 1930's, then rose to 1.6 in 1950-1954 and to nearly 1.8 in 1955-1959. In Canada, the gross reproduction rate amounted to about 1.6 in the 1920's, about 1.3 in 1935-1939, and attained 1.9 in the 1950's. The recent rise in fertility was far greater than the crude birth rate suggests. This is illustrated below in the comparison of crude and sex-age adjusted birth rates for the United States in years 1940-1962.

| Period | United States birth rate (per 1,000) | |
|---------------------|---|---------------------|
| | Crude | Sex-age Adjusted |
| 1940-1944 | 19.9 | 18.5 |
| 1945-1949 | 23.4 | 22.3 |
| 1950-1954 | 24.5 | 25.0 |
| 1955-1959 | 24.6 | 27.7 |
| 1955 | 24.7 | 26.8 |
| 1956 | 24.9 | 27.6 |
| 1957 | 25.0 | 28.3 |
| 1958 | 24.3 | 27.9 |
| 1959 | 24.1 | 28.1 |
| 1960 | 23.7 | 28.0 |
| 1961 | 23.3 | 28.0 |
| 1962 | 22.4 | 27.1 |

In the 1950's, the continuing rise in fertility is in part accounted for by a progressive lowering of the average age of women at marriage and consequently of the peak age of child-bearing. The lowest average age at marriage appears to have been reached about 1950, and again about 1956,² with a repercussion on the birth rate that continued

² Bureau of the Census, Government of the United States, "Marital Status and Family Status: March 1962", *Current Population Reports*, Series P-20, No. 122 (22 March 1963).

for a number of subsequent years but has apparently now run most of its course. This may be part of the reason for the quite recent decrease in the crude birth rate, though other circumstances, such as changes in the population's age composition and in desired family size, also played a part not yet clearly assessed. There also seems to be a renewed tendency in recent years to postpone marriages somewhat.

Changes in age composition of the population must likewise be taken into account in interpreting the trend in the crude death rate. Expectation of life at birth (both sexes) in the United States was about 59 years around 1930, 64 years around 1940, 68 years around 1950, and 70 years around 1960. At most of these dates, it was slightly greater in Canada, but the difference between the two countries has narrowed with time and has become quite small. Even with further improvement, crude death rates will hardly decrease in the future, and may even rise somewhat.

3. MIGRATION

Over a long period, immigration, mostly from Europe, has contributed substantially to population growth in this region. In the 1920's, net immigration amounted to more than three million in the United States and more than a quarter-million in Canada, but early in the 1930's, the inward movement almost came to a standstill and as some of the previous immigrants returned to Europe, both countries experienced a slightly migratory loss. After 1945, immigration was resumed on a considerable scale, bringing a net migratory gain of one and three-quarter million to the United States and over 100,000 to Canada by 1950. During the 1950's, the migratory gain amounted to almost three million in the United States and at least one million in Canada. A peak rate of immigration was reached about the middle of the decade with almost 400,000 migrants entering the United States in 1956, and about 282,000 entering Canada in 1957. Since then, migration has diminished again. During 1958-1960, annual net immigration averaged about 300,000 persons in the United States and about 60,000 in Canada. Actually, Canada receives larger numbers of immigrants, but some Canadians migrate to the United States, thereby decreasing the net balance for Canada and increasing that for the United States.

A considerable part of the immigration since 1945 has consisted in the resettlement of displaced persons and refugees from European countries. More recently, a substantial proportion of the migrants entering the United States has been of Latin American or Caribbean origin. With increased political and economic consolidation, Europe will presumably supply fewer migrants in the future than it did in recent years. Still larger numbers would then have to come from other areas, e.g., the Caribbean or Mexico, if the regional migratory balance is to remain as high as it was in the 1950's.

4. PROJECTIONS FOR COUNTRIES, 1960-1980

Population projections have been calculated repeatedly by various agencies in the United States and Canada. Those calculated by the United States Bureau of the Cen-

sus are revised from time to time so as to take into account the latest information.³ Uncertain fluctuations in fertility being the major variable, research institutes have conducted surveys on the expected growth of families, and the information so obtained makes it pertinent to calculate population projections by the cohort method.⁴ This method has also been adopted in the projections carried out most recently by the United States Bureau of the Census.⁵ In the Census Bureau's projections, various combinations of assumptions were made, including four distinct series of average family size eventually to be attained by successive generations of women as they pass through the reproductive life-span, two distinct rates of change in the expectation of life at birth, and the assumption of an annual inward migratory balance of 300,000 individuals. The several combinations yielded population totals varying in the range of 233 to 254 million by the year 1980. The average of the two projections implying an eventual decline in the gross reproduction rate to about 1.46, in combination with a moderate further rise in expectation of life at birth to 73 years by 1975-1980, was selected as most pertinent to the present purpose. This small further rise in expectation of life agrees very nearly with general assumptions made elsewhere in this report for areas where mortality is very low.

Population projections for Canada drawn up with assumptions comparable to those of the United States were not available.⁶ Therefore, a projection for Canada was derived from the one for the United States by assuming constant proportions between the United States and Canada for survivors from each sex age group and, furthermore, that at any future date the child-woman ratio⁷ in Canada would exceed that in the United States by 5.75 per cent as it did in 1960 and approximately also at earlier dates. An additional adjustment was made so that the assumption as to net immigration into Canada would be comparable with the corresponding assumption in the United States projection.⁸

From the selected projection for the United States and its adaptation for Canada as described above, the future

population estimates for the period 1960-1980 shown in table A3.8 were obtained. Future estimates for Bermuda, Greenland, and St. Pierre and Miquelon were added on the assumption that growth in these areas would continue at rates roughly comparable with those of the 1950's.

In the twenty-year period, the population increase would be about one-third in the United States and nearly one-half in Canada. In both countries, population growth would slow down somewhat in the course of the 1960's but, in spite of assumed decrease in fertility, would accelerate once more during the 1970's largely because persons born since 1946, when the birth rates rose, will then be in the ages of potential parenthood.

5. VARIANT AND LONG-RANGE PROJECTIONS

"High", "low", and "medium" variant projections of the total population of Northern America for the period 1960-2000 are shown in tables A3.2 to A3.4, annex 3. These projections, intended for world-wide comparisons, were carried out with the same methods used for other regions, and the assumptions were drawn up independently of those made in the latest available projections for the United States and Canada. Such long-range calculations were carried out separately for the United States and for Canada, and the sum of the two was slightly augmented to include Bermuda, Greenland, St. Pierre and Miquelon.

Immigration assumptions for the "high", "low" and "medium" projections were chosen with a view to consistency with the emigration assumptions adopted as a basis for regional projections for Europe. The separate projections for the United States and Canada assume immigration continuing in the future at about the same average rates recorded in the two countries during 1958-1960, or an annual net total of about 360,000 immigrants for the two countries. On the other hand, in projections for the European areas which have long been the main sources of migration to the United States and Canada, it has generally been assumed that emigration in the future will be less than it has been in the recent past. To be sure, smaller emigration from Europe would be compatible with immigration to Northern America continuing on an undiminished scale, if the flow of migrants to Northern America from regions other than Europe should increase greatly in the future. Such a change is possible, but as yet no large, long-continuing currents of migration of non-Europeans to Northern America have become established. Hence, for the three variant projections shown in tables A3.2 to A3.4 of annex 3, net immigration to Northern America from 1960 to 1980 was assumed to average only 100,000 instead of 360,000 annually, and the net inflow after 1980 was assumed to decrease linearly until it would disappear at the end of the century.

While it was assumed that expectation of life of 73.9 years (both sexes) would prevail from 1970 onward, three alternative courses of fertility were assumed to obtain the "high", "low" and "medium" variants.⁹ The calculations were made with respect to the United States, those for Canada were derived by the method already described,

³ Bureau of the Census, Government of the United States, "Interim revised projections of the population of the United States by age and sex: 1965 and 1970", *Current Population Reports*, Series P-25, No. 241, extended to 1980 in Series P-25, No. 251 (6 July 1962). This is a revision, to take account of the 1960 census results, of "Illustrative projections of the population of the United States by age and sex: 1960 to 1980", Series P-25, No. 187 (10 November 1958).

⁴ Freedman, Whelpton and Campbell, *Family Planning, Sterility and Population Growth* (New York, 1959). Fertility expectations have been determined in surveys and projected in terms of an expected average family size to be attained progressively as successive generations of women pass through the child-bearing ages.

⁵ Bureau of the Census, Government of the United States "Projections of the Population of the United States by Age and Sex to 1985", *Current Population Reports*, Series P-25, No. 279 (4 February 1964).

⁶ The latest available population projection for Canada was calculated with assumptions varied in respect of migration, but not in respect of fertility. W. C. Hood and A. Scott, *Output, Labour and Capital in the Canadian Economy* (Royal Commission on Canada's Economic Prospects, February 1957).

⁷ Calculated as ratio of children aged 0-4 years to women aged 20-39 years.

⁸ In the United States projection, an annual net immigration of 300,000 persons was assumed, roughly equal to actual net immigration on the average of 1958-1960. During that period, net immigration to Canada averaged about 60,000, i.e., one-fifth of the United States figure, though the population of Canada is only about one-tenth that of the United States. An adjustment was made, therefore, allowing for the effects of annual net immigration of about 60,000 persons to Canada.

⁹ The "medium" variant agrees, in respect of mortality, with the projections shown in table A 3.8 up to 1980, the difference between this and the general mortality assumption being only very slight.

and the sums of the two results were pro-rated to the regional total for 1960, so as to include the population of Bermuda, Greenland, and St. Pierre and Miquelon.

For the "high" projection, the United States sex-age adjusted birth rate, 28.0 per 1,000 in 1960, was assumed to decrease to 25.0 per 1,000 (same as observed on the average of 1950-1954) by 1980, and then to remain at that level. For the "low" assumption, it was made to decrease to 18.0 per 1,000 (comparable to the immediate pre-war level of 17.9 per 1,000 in 1940-1942) by 1965, with no change thereafter.

For the "medium" variant, fertility was assumed to change as in the national projection selected for table A3.8 (which was calculated in terms of successive age cohorts of women) until 1980; the assumption implies some decrease in fertility, resulting in a sex-age adjusted birth rate near 24 per 1,000 about 1980.¹⁰ Continuation of this variant to the end of the century was calculated by maintaining the sex-age adjusted birth rate at that level. Again, the fertility trend of Canada was assumed to parallel that in the United States; the sex-age adjusted birth rate of Canada would then settle slightly above 25 per 1,000. As the significance in the long-run of the recent decrease in

¹⁰ Applying "reverse-survival" to data of the original projection (which extends to 1985), one obtains the following implied sex-age adjusted birth rates: 26.7 in 1960-1965; 24.9 in 1965-1970; 24.9 in 1970-1975; 24.7 in 1975-1980, and 24.0 in 1980-1985. This implied trend suggests that, in conformity with the assumptions originally made, the sex-age adjusted birth rate may settle near a value of 24.0 per 1,000 from 1980 onward.

the birth rates of the United States and Canada cannot yet be assessed, it must be admitted that the long-range projections are rather uncertain at this moment. The "medium" assumption gives results nearer the "high" than the "low" variant, a fairly large decrease in fertility now being possible but not predictable with much assurance. It will also be noted that the "medium" variant up to 1980 falls below the sum of the projections made separately for the United States and Canada because of the difference in the migration assumptions noted above.

In the forty-year period, the three variant projections show increases in the population of Northern America between 50 and 90 per cent. Except on the "low" assumption of a rather sharp down-turn in fertility, the increase would be more rapid in the 1970's than in the 1960's since an increased parental generation, themselves born under the comparatively high birth rates of recent periods, would then be at the ages of procreation. Somewhat slower growth towards the end of the century corresponds in part to the assumption of a decreasing migratory balance, and in part also to fertility declines which may occur in the 1960's. Thus, on the "low" variant, assuming a rather pronounced fertility decline, a relatively reduced parental generation towards the end of the century would result in a slow-down of the population growth to a rate near that of the 1930's. On the other hand, even on the "high" variant, it appears rather unlikely that growth at a rate as high as in the 1950's will be exceeded in future decades.

Chapter 16

LATIN AMERICA

A. TROPICAL SOUTH AMERICA

In the countries of Tropical South America, censuses have been taken with varying frequency, and the accuracy of some has been questioned. Censuses were taken in 1960 or more recently except in Bolivia and Colombia, where the latest census data available at the time of preparation of this report dated from 1950 and 1951, respectively. Some of the census reports on total population include officially estimated allowances for omissions in the enumeration and for indigenous population groups inhabiting remote forest regions and generally not enumerated. The exceptionally large population increase indicated by the Brazilian censuses of 1950 and 1960 gave occasion for a detailed recalculation of probable population trends during 1950 to 1960 which led to the inference that the enumeration of children at the 1950 census may have been somewhat deficient.¹ An unofficial revision of the Brazilian data was adopted for the present purpose so as to make the estimate of the past population trend coherent with the population projections. While the accuracy of several of the other censuses, including official adjustments for census omissions and estimates of indigenous jungle population, is somewhat debatable, they reflect fairly well the population trends and the underlying demographic factors can be inferred with a fair degree of approximation from the census age distributions.

Vital statistics are also recorded in all these countries except that those for Brazil are not published in national summaries, as registration in large areas of that country is still very defective. In most of the other countries, vital statistics registration has improved but does not yet faithfully reflect the levels and trends of fertility and mortality. The statistics are now believed to be virtually accurate in British Guiana (except for the indigenous population) and Surinam and no longer to fall far short of the facts in Venezuela and Ecuador.

1. Population growth, 1920-1960

According to the estimates compiled in annex 3, table A3.8, the regional population increased nearly $2\frac{1}{2}$ fold from 1920 to 1960;² it tripled in Venezuela, while in Peru and Bolivia it appears to have nearly doubled. The esti-

mates reflect a continuing acceleration of population growth to which further momentum was added in the 1950's, especially in Brazil, Peru and Venezuela. In Venezuela, however, the exceptionally high rate of increase in 1950-1960 was in part result of immigration. There is some doubt as to the accuracy of some of the population estimates for 1920 and 1930, and it is possible that the population increases in some countries are either overestimated or underestimated for the early decades.

2. Fertility

Owing to imperfections in the vital statistics, the birth and death rates for most countries in this region had to be estimated mainly from census data on age composition and rates of population increase. In all these countries, fertility is high and has shown little or no indication of change. With decreases in mortality, a small decrease in the crude birth rate can occur, owing to a minor modification of age structure, without any change in the fertility of women of child-bearing ages. According to most recent estimates, the crude birth rate was about 47 per 1,000 in Ecuador (1940-1945), 46 in Peru (1930-1935), 45 in Venezuela (1960), 44 in Colombia (1941-1946), and 43 in Brazil (1940-1945), Bolivia (1940-1945), and British Guiana (1960).³ All these rates, in populations of slightly varied age composition, are consistent with gross reproduction rates within the narrow range of 2.9 to 3.2.

A nearly constant birth rate of about 45 per 1,000 has been reported in Venezuela since 1950, a period in which registration may have been fairly accurate, and the rates recorded in Ecuador likewise fluctuated about that level, showing no trend. In British Guiana and Surinam, two areas with accurate registration, birth rates rose in the decade of the 1950's from about 42 to about 45 per 1,000, decreasing again to 42 per 1,000 by 1962 in British Guiana. However, in British Guiana the rates recorded in decades before 1950 were mostly in the range of 30-35 per 1,000, i.e., much lower than the prevailing rates in the rest of the region. Estimates from census age data suggest that the birth rate in Brazil was 45 per 1,000 in 1930-1935 and 43 in 1940-1945; in Colombia, 46.5 in 1928-1933 and 44 in 1941-1946. For Venezuela the estimates indicate 44 in 1926-1931, 42 in 1940-1945, and 45 in the 1950's. The small estimated decreases during earlier decades might be accounted for by the small shift in age composition

¹ C. Arretx, *Proyección de la población del Brasil por sexo y grupos de edades, 1940-1980*. Santiago, Chile, Centro Latinoamericano de Demografía (CELADE), 1963 (unpublished).

² Estimates according to the *Statistical Bulletin for Latin America*, vol. I, No. 1 (March 1964) Santiago, Chile, Economic Commission for Latin America except those for British Guiana, Surinam, and French Guiana.

³ Estimates for Ecuador, Peru, Colombia, Brazil and Bolivia by "reverse-survival" from census data, other estimates are a birth rate of 44.25 per 1,000 in Brazil during 1940-1950 and 44.0 in Bolivia on an average of several past decades (see sources of population projections cited further on).

caused by reduced mortality, but the Venezuelan data seem to offer some evidence of a recent small rise in fertility. Since recent health improvements were most substantial in Venezuela, British Guiana and Surinam, the observations suggest, without proving the fact, that improving physical well-being might have caused some rise in fertility. However, given the probable margins of error in most of these estimates, it is uncertain whether the apparent small changes did in fact occur.

Fertility varies among geographic areas within some of the countries, according to data or estimates from age composition. It is generally lowest in the urban population, and especially in big cities, and it is also below average in certain regions, such as the Southern portions of Brazil and the Andean highlands of Ecuador. Some of these geographic differences may have existed for a long time; they are not necessarily the result of recent changes. It should also be noted that marriage customs vary and that in some regions consensual unions are more prevalent than legal marriages. In those regions, rates of child-bearing are generally higher among young women and lower among older women than is the case where most marriages are legally sanctioned. The response of fertility to changing economic and social conditions may vary with different types of conjugal unions.

Considering the large size of some of the cities in the region, the recent progress in health and education, the development of mass media of communication, and the precarious living conditions of large segments of the urban population, it can be recognized that circumstances are present which elsewhere have eventually provoked a large decline of fertility. While a decline may be imminent and may even have begun already in some areas of Tropical South America, the available statistics do not reveal any such tendency. It is also possible that such a tendency may have been checked up to the present time by the opposite effects of improved health. These and other considerations make it very hazardous to predict how soon a significant trend towards reduced family size may set in and how rapidly it may proceed once it begins. It is probable, nevertheless, that fertility will eventually fall under the pressures likely to result from rapid growth of urban population and other social and economic changes attendant on the future development of these countries. This expectation is strengthened by the observation that fertility is considerably lower in the more developed countries of Temperate South America.

3. Mortality

Though the available statistics are generally not adequate for an accurate assessment of recent levels and trends in mortality, it is certain that in recent periods the reduction of death rates has been very large. Close study of data on population growth and structure, including the age distribution of reported deaths, leads to the estimate that early in the twentieth century the regional death rate must have been of the order of 30-35 per 1,000 and that it decreased gradually to the range of 20-25 per 1,000 late in the 1930's. From about 1945 onward, death rates decreased much more rapidly as witnessed by the diminishing proportion of deaths of children and young persons among all reported deaths.

The recent levels of death rates and expectation of life for most of the countries cannot be calculated with much accuracy. Given the estimated birth rates and rates of population growth during the decade of the 1950's, death rates may have averaged about 12 per 1,000 in Venezuela and British Guiana (and this is confirmed by the more accurate vital statistics for these two countries), 14 per 1,000 in Brazil, 16 per 1,000 in Colombia, possibly 18 per 1,000 in Ecuador, and 20 per 1,000 if not higher in Peru and Bolivia. However, as the death rates were falling in the course of the decade, significantly lower rates would have prevailed by 1960. For the average of the 1950's, the estimated crude death rates reflect expectations of life at birth generally in the range of 45 to 55 years. The medical and sanitary services now available in the region are considerable and great efforts have been put forth in the control and eradication of malaria, protective vaccination against infectious diseases, environmental sanitation, and popular education pertaining to nutrition, child care and personal hygiene. In view of the progress made elsewhere under comparable conditions, and the evidence of a decreasing proportion of deaths occurring at early ages, it is probable that towards 1960 an average regional expectation of life at birth (both sexes) of about 55 years was attained. Differences still persist, however, among the countries; mortality in Venezuela and the Guianas is evidently lower than the regional average whereas in Bolivia and Peru it is probably still above the average.

Experience with public health programmes in developing countries shows that the higher expectation of life rises, the more costly are the additional investments needed in order to make further gains, as these depend to an increasing extent on the elimination of causes of death which are not so tractable with limited means. For this reason, progress in raising the expectation of life in Tropical South American countries may be slower in the future than it has been in the last decade, even though increasing amounts of resources are dedicated to expansion of trained medical staff, construction and equipment of hospitals, improvement of housing, and other activities contributing to a rising standard of health.

4. Migration

Immigration has played a part in the growth of population in this region though, as compared with the high rates of natural increase, it has been of a secondary order of magnitude. The role of immigration from Europe was more important in the 1920's and earlier decades than it has been recently. The rapid growth of population in the Brazilian State of São Paulo, for instance, owed much to European immigration in earlier decades. This immigration was sharply reduced in the 1930's and became negligible in the 1940's, and although it revived in the 1950's it was not large in relation to the greatly increased population of Brazil at that time.¹ For a few years centring

¹ G. Mortara, "The development and structure of Brazil's population", *Population Studies*, vol. VIII, No. 2 (November 1954) (London). The author estimated that about 3,400,000 immigrants settled in Brazil between 1850 and 1950 giving rise, with their descendants, to an additional population of about 6,800,000 which represents about 15 per cent of the absolute increase in Brazil's population from 1850 to 1950. It is estimated, on the other hand, that the contribution of migration to population growth in Brazil during 1950-1960 was less than 4 per cent.

about 1950, Venezuela received an influx of European immigrants which was large in relation to the population of that country but the immigration diminished in subsequent years and more recently Venezuela's net balance of migration has been negligible. There are now no grounds for an expectation that immigration will occur again in Tropical South America on a scale that would appreciably affect the rate of increase in the regional population.⁵

5. Projections for countries, 1960-1980

An official population projection was available for Venezuela⁶ but not for other countries of the region at the time when the present report was being prepared. Projections for Brazil, Ecuador and Bolivia had been calculated by the Latin American Demographic Centre (CELADE) and for Colombia by the Economic Commission for Latin America; an earlier United Nations projection for British Guiana still appeared pertinent.⁷ A suitable projection for Peru was lacking so that a theoretical population model was substituted, while for Surinam it was assumed for the purpose of the present report that population would grow at rates similar to those anticipated for British Guiana. Rough estimates were made for the population of French Guiana, which is small in relation to the regional total, and the numbers of jungle inhabitants, not considered in some of the available population projections, were assumed to remain constant. The several projections, prorated to population estimates for 1960 and brought together in table A3.8, annex 3, were made by various authors and at different times, and therefore are not necessarily comparable.

With respect to mortality, the projections implied the following rises in expectation of life at birth (both sexes) between 1960-1965 and 1975-1980: from 43.8 to 48.3 years in Bolivia; from 45.6 to 49.4 years in Peru; from 49.0 to 58.0 years in Ecuador; from 54.0 to 62.3 years in Colombia; from 58.4 to 63.0 years in British Guiana and Surinam; and from 60.4 to 68.2 years in Venezuela. The projection for Brazil assumed life expectancies (both sexes) of 41.2 years in the 1940's, 52.6 in the 1950's, 57.7 in the 1960's, and 62.4 in the 1970's. It will be noted that comparatively small gains were foreseen in the projections for Peru, Bolivia and the Guianas, and comparatively large gains for Ecuador, Colombia and Venezuela, but it is far from certain that the appraisals were comparable.

Constant fertility rates for women of reproductive ages were assumed in the projections for Ecuador, Peru and the Guianas, and nearly constant fertility for Venezuela; the effects of decreasing mortality on age composition imply, in these instances, small decreases in the crude

birth rates. A constant crude birth rate (implying a slight rise in fertility) was assumed in the projection for Bolivia. For Colombia, constant rural and urban fertility rates were assumed, implying a small decrease in the average fertility level for the nation as urbanization progresses. The projections implied the following average crude birth rates in 1960-1965 and 1975-1980, respectively (per 1,000): 45.1 and 44.0 in Ecuador; 45.0 and 44.8 in Peru; 44.4 and 40.5 in Brazil; 44.0 (constant) in Bolivia; 43.3 and 42.5 in Venezuela; and 42.6 and 39.2 in Colombia. A more sizable decrease of the crude birth rate was assumed in the projection for Brazil, from 44.0 in the 1940's and 42.5 in the 1950's to 39.5 in the 1960's and 36.2 in the 1970's. A constant sex-age adjusted birth rate of 44.0 was assumed for the Guianas.

The projections for Brazil, Peru, Venezuela and Ecuador had been calculated without the jungle inhabitants. Estimates of the latter according to latest official data were added for the purpose of the present report, with the assumption that their numbers would not change. The projection for Bolivia made allowance for a small amount of emigration, such as the migration to Argentina which has been observed from census data in that country. No migration was assumed in the projections for other countries in this region.

The results of the several projections show a doubling of the population in Venezuela within the twenty years, an increase by four-fifths in several other countries, by three-quarters in Brazil, and by about two-thirds in Bolivia. It is uncertain whether the prospects for the different countries have been judged by the same standards. The projection for Brazil implies a diminishing rate of population growth, whereas more or less considerable acceleration occurs in the projections for other countries. Because of the considerable weight of Brazil in the regional total, the sum of projections implies a fairly constant rate of growth in the regional population. The "medium" variant for the region, explained below, suggests a high but eventually diminishing rate of growth.

6. Variant and long-range projections

Since fertility, mortality and age structure of the population of Brazil are near the regional averages, the long-range projections for the region of Tropical South America as a whole were calculated by introducing modifications and extensions into the projections for Brazil and multiplying all results with a constant so as to conform to the estimated total regional population as of 1960.

For the three variants, "high", "low" and "medium", it was assumed that the regional average expectation of life at birth would rise slowly after 1970, when it would begin to exceed 60 years, and that it would attain 68.2 years by 1995-2000.

A wide variety of fertility assumptions can be regarded as almost equally probable. For purposes of the "high" variant of the projection, it was assumed that fertility would remain unaltered until 1980 and decline from that time onward with the assumption that the sex-age adjusted birth rate would be halved in forty-five years. For the "low" variant, the date of onset of the fertility decline was

⁵ A. T. Bouscaren, "Latin America in International Migrations", *R.E.M.P. Bulletin*, (Research Group for European Migration Problems), vol. 10, No. 4 (December 1962).

⁶ Oficina de Análisis Demográfico, Dirección General de Estadística y Censos Nacionales, Gobierno de Venezuela, *Proyección de la población de Venezuela* (Caracas, 1963).

⁷ C. Arretx, op. cit.; United Nations Economic Commission for Latin America, "Proyección de la población urbana, población rural y fuerza trabajadora de Colombia" (1960) (mimeographed); B. Nieto Terán, *Proyección de la población del Ecuador, 1950-1980* (CELADE, June and September 1961); J. Somoza, *Bolivia: Proyecciones demográficas*, and J. Somoza, *Proyección de la población de Bolivia, 1950-1975* (CELADE, June and September 1961); *The Population of South America, 1950-1980* (United Nations publication, Sales No.: 55.XIII.4).

put at 1965, and it was assumed to run its course within the thirty years up to 1990.

As these assumptions were relatively extreme, it appeared appropriate for the "medium" variant of the projection to assume a slow decline in the average fertility of the region. In Tropical South America, large population groups are often separated by wide distances and there are also instances of rather distinct social stratification of population groups that differ widely in economic circumstances and education. Though fertility may already be decreasing among relatively small minorities in limited areas, a long time may elapse before family limitation crosses the spatial and social distances and becomes a general practice among most of the population. The assumption was therefore made that the reduction of the sex-age adjusted birth rate to eventually half the initial level would begin in 1970 and take 45 years. Estimated as 45.0 per 1,000 in 1960, the sex-age adjusted birth rate of the region would then drop to 44.2 by 1970, 40.5 by 1980, 34.5 by 1990, and 31.5 by the end of the century. It must be emphasized that this is a very free conjecture, useful perhaps for the present report, but no more probable than many another assumption that might have been made instead.

The future regional population totals resulting from the variant assumptions are presented in annex 3, tables A3.2 to A3.4. The "low" and "high" variants indicate that the 1960 population total may increase to between 2.7 and 3.5 times the initial size within 40 years while the "medium" variant suggests an increase of more than three-fold. The high rate of growth in the 1950's, when the region's population was augmented by one-third, would persist or be exceeded for four more decades according to the "high" variant, for three decades according to the "medium" assumption, and up to 1980 if the "low" variant of immediate and substantial fertility decline should be borne out.

B. MIDDLE AMERICA (MAINLAND)

Population trends are now well documented in most countries of this region. For several decades censuses have been taken periodically in Mexico and Panama, and repeatedly in all remaining countries. A census has been taken in 1960 or more recently in all the countries except Guatemala, where the latest census data available at the time of the preparation of this report were those of 1950. The successive census results agree fairly well with the population increases in recent periods which can be calculated from statistics of births and deaths and these, in turn, can be checked with census data on population age composition. There are doubts as to the accuracy of some of the earlier censuses in Guatemala, El Salvador, Honduras and Nicaragua; the population estimates have been adjusted with these considerations in mind.

Comprehensive registration of births and deaths has been practised in all these countries for many decades and has probably become fairly accurate in several countries, though some doubts remain particularly about that of Nicaragua, where registration is still believed to be defective, and that of Panama, where a significant omission in the reporting of deaths still occurs, and possibly in some other instances as well.

1. Population growth, 1920-1960

According to the population estimates for the period from 1920 to 1960 shown in table A3.8 of the annex, the region's population increased by 140 per cent. In fact, the population of all countries more than doubled within the 30 years from 1930 to 1960, except in El Salvador and Honduras, where it may have increased somewhat less. Between 1920 and 1960, the increase was 109 per cent in El Salvador, 134 per cent in Nicaragua, 135 per cent in Honduras, 141 per cent in Mexico and Panama, 160 per cent in Guatemala, and 178 per cent in Costa Rica though actually, as some of the estimates for 1920 may have been inaccurate, the increase for some of the countries is not determined with such exactitude.

The population of Mexico grew at nearly the same rates as that of the entire region, by about 15 per cent in the 1920's, 20 per cent in the 1930's, 30 per cent in the 1940's, and 35 per cent in the 1950's. The trends were roughly parallel in the other countries, except for possible errors of estimates: the increases were generally higher in Costa Rica and lower in El Salvador, partly owing to some emigration from El Salvador, particularly to Honduras. The increase of 46 per cent in Costa Rica from 1950 to 1960 is unparalleled in any country where immigration has not occurred on a substantial scale, but seems to be confirmed both by the comparison of census results for 1950 and 1963 and by the excess of births over deaths from presumably accurate registration data.

2. Fertility

The crude birth rates recorded since 1930 in five countries of the region where registration appears to be most accurate are shown in table 16.1. In all five countries, a

TABLE 16.1
Crude birth rates in five Middle American countries,
1930-1960
(Per 1,000 population)

| Period | Mexico | Guatemala | El Salvador | Costa Rica | Panama |
|-----------------|--------|-----------|-------------|------------|--------|
| 1930-1934 . . . | 44.5 | 51.6 | 43.3 | 45.7 | 36.5 |
| 1935-1939 . . . | 43.5 | 47.7 | 42.7 | 45.0 | 36.4 |
| 1940-1944 . . . | 44.2 | 47.2 | 43.3 | 44.9 | 37.5 |
| 1945-1949 . . . | 44.4 | 50.6 | 44.4 | 45.1 | 36.0 |
| 1950-1954 . . . | 44.9 | 51.4 | 49.4 | 49.2 | 35.9 |
| 1955-1959 . . . | 45.9 | 49.1 | 50.0 | 50.0 | 39.9 |
| 1960 | 46.0 | 49.5 | 49.9 | 50.2 | 41.0 |

rise is noted during the 1950's. Part of the rise may be attributable to improved registration though it is improbable that registration in El Salvador and Costa Rica improved so much. Some rise above the already high level of fertility may have been caused by the improved state of health and also by increasing stability of conjugal unions in those areas where common-law marriage is frequent.* Annual fluctuations in the rates, however, may have been caused by delays in the registration of births which occur

* In parts of the Caribbean region and in Venezuela, there have been significant rises in fertility in the 1950's; these have been attributed to the same circumstances.

more frequently in some years than others. Rates slightly lower than those of 1960 were reported in 1961 and 1962 in Costa Rica, Guatemala, Honduras and Nicaragua.

Fertility differences between urban and rural areas and among economic and social groups of the population have been noted in Mexico⁹ but are not necessarily indicative of any impending change in the prevailing high level. Although urbanization has recently been particularly rapid in Mexico, there is as yet no sign of any significant decrease in the high birth rate. In many respects, the conditions now present in the region resemble those which have been associated elsewhere with the onset of decisive fertility declines. Great progress has been made in education and public health, improvements in transport, and circulation of media of mass communication, and substantial progress in industrialization. The present lack of evidence of any tendency to reduce the size of families, in a setting where much further urbanization and industrialization can be expected, makes it difficult to foresee the future trend in birth rates. The situation is similar to that of Tropical South America, but some differences in the circumstances of the two regions should be taken into account. The Middle American mainland, with a large part of its population concentrated in central Mexico, has somewhat greater cultural homogeneity, has shorter distances and better means of communication than most of South America. Though this is a matter of degree, there is a possibility that changes in attitudes with respect to family size may spread more rapidly in Middle America than in much of South America. On the other hand, there is less evidence in Middle America of such changes having already begun. Currently, the gross reproduction rate in the Middle American mainland is estimated at an average of 3.1, the same level as Mexico, while it varies from 2.7 in Panama to 3.5 in Costa Rica.

3. Mortality

Table 16.2 shows recorded crude death rates for Mexico and three other countries of the region for periods since 1930. In these countries, death registration appears to have been fairly accurate for some time, but some omissions from registers may still occur. Though mortality probably was higher in the 1920's, the registration data do not indicate this, presumably because registration was distinctly less complete at that time. Between 1930-1934 and 1960, the recorded death rate of Mexico was reduced by 55 per cent, Guatemala by 33 per cent, El Salvador by 52 per cent, and Costa Rica by 61 per cent; if registration was still improving after 1930, it is possible that the actual reductions in mortality were even greater. In 1960 a death rate of 7.8 was recorded in British Honduras, 8.4 in Panama, 8.6 in Nicaragua, and 9.8 in Honduras, but it is possible that in some of these countries registration was not complete.

Expectation of life at birth (both sexes) according to official life tables rose in El Salvador from 51 years about 1950 to 58 years about 1960, and in Panama from 52 years about 1942 to 62 years about 1953. In 1950, the life tables for Guatemala and Costa Rica indicate expectations of

TABLE 16.2
Crude death rates in four Middle American countries,
1930-1960
(Per 1,000 population)

| Period | Mexico | Guatemala | El Salvador | Costa Rica |
|---------------------|--------|-----------|-------------|------------|
| 1930-1934 | 25.6 | 26.1 | 23.0 | 22.1 |
| 1935-1939 | 23.3 | 26.5 | 21.1 | 20.0 |
| 1940-1944 | 22.1 | 27.8 | 20.5 | 18.3 |
| 1945-1949 | 17.8 | 23.8 | 17.1 | 14.0 |
| 1950-1954 | 15.5 | 21.4 | 15.2 | 11.6 |
| 1955-1959 | 12.5 | 19.9 | 13.2 | 9.6 |
| 1960 | 11.5 | 17.5 | 11.0 | 8.6 |

life of 44 and 56 years, respectively. Mexico's official life table for 1940 shows an expectation of life at birth of only 39 years but for 1960 it has been calculated to have risen to 59 years.¹⁰ Though some of the official life tables have been calculated from incomplete death registration data, progress in increasing life expectancy in this region has evidently been unusually rapid. The trend in crude death rates suggests that expectation of life in Costa Rica and Panama may now be higher than in Mexico while in some of the other countries, particularly Guatemala, it may be somewhat lower. As a regional average, expectation of life in 1960 may have amounted to between 56 and 57 years.

While a rather low level of mortality has been attained very quickly in this region, it is probable that further decreases will be less rapid in the future. Very high expectations of life depend on heavy expenditure in medical services and a large deployment of well-trained medical staff. Though progress can be expected to continue, it will probably become slower because of the increasing cost. In this respect also, present conditions resemble those noted in Tropical South America but the position of the Middle American mainland may be slightly more favourable in view of shorter distances and greater ease of travel and transport.

4. Migration

Migration from El Salvador and to Honduras has been large enough to affect the rate of population growth in the two countries, and there appears to have been also some migration from Nicaragua to Costa Rica. In addition to these movements within the region, there has been a large amount of migration between Mexico and the United States, including much seasonal migration of farm workers and daily movements between adjacent towns on opposite sides of the national boundary. Though most of those movements leave little net balance, there has been an increase of Mexican-born population in the United States and a small increase also in the number of United States citizens residing in Mexico. These shifts are not accurately reflected in the balance of migration statistics of the two countries. According to the United States statistics, there is a large balance of immigration from Mexico, whereas according to Mexican statistics, including movements to and from areas other than the United

⁹ For example, A. J. Jaffe, *People, Jobs and Economic Development* (Glencoe Press, Illinois, United States, 1959), p. 251.

¹⁰ Z. L. Recchini, *Tabla Abreviada de Mortalidad; Republica de Mexico; 1959-1961* (E/CN.CELADE/C.1) (Santiago, Chile, 1963).

States, the migratory balance is positive in Mexico. As calculated from United States census data on population born in Mexico, net migration from Mexico should have averaged about 20,000 persons per year in the period from 1950 to 1960.¹¹ Since migration to the United States from other areas, such as from Puerto Rico, has diminished in recent years, a balance of about 15,000 a year may be more representative of the present movement. It is possible that Mexican migration to the United States may continue on such a moderate scale, but there are few indications for an expectation of other currents of migration that would have significant effects on the growth of population in this region.

5. Projections for countries, 1960-1980

Population projections for Mexico, Guatemala and Panama had recently been calculated at the Latin American Demographic Centre,¹² and one for British Honduras at the United Nations.¹³ For El Salvador, Honduras, Nicaragua and Costa Rica, new population projections were not available when the present report was in preparation. Projections for all countries of the region had been calculated on earlier occasions by the United Nations and the Economic Commission for Latin America but in the light of new census data, they could no longer be regarded as up to date.¹⁴ In the earlier United Nations projections, both fertility and mortality in the period of the 1950's seemed to be under-estimated, while in the projections made later by the Economic Commission, though fertility and mortality about 1950 may have been estimated more accurately, there was an under-estimate of the rapidity of mortality decline. Since both sets of projections fell short of recent census results, they were not used for the present purpose; extrapolations were substituted for El Salvador, Honduras, Nicaragua and Costa Rica. The civilian population of the Canal Zone, and the tribal Indians not included in the population projection for Panama were assumed to remain constant. The projections presented in annex 3, table A3.8, were pro-rated to the present estimates of the 1960 population.

The selected projections imply rises in expectation of life at birth (1960-1965 to 1975-1980) from 60.4 to 68.2 years in British Honduras, and from 47 to 53 years in Guatemala. Constant fertility was assumed: a sex-age adjusted birth rate of 47.3 in British Honduras, and gross reproduction rates of 3.19 in Guatemala, 3.11 in Mexico and 2.90 in Panama.

Pending further study, interim estimates of future population have been made by the Economic Commission for Latin America, assuming growth at the constant an-

nual rate of 3.2 per cent in El Salvador, and 3.5 per cent in Honduras and Nicaragua, while estimates for Costa Rica were extrapolated on a curve based on census results of 1927, 1950 and 1963. These estimates were adopted after pro-rating in accord with revised estimates for 1960.

According to these projections and extrapolations, the population of Mexico, Honduras, Nicaragua and Costa Rica would double within twenty years whereas in Guatemala, El Salvador and Panama it would increase by 80 to 90 per cent. But it is not certain that the assumptions have been comparably drawn up. Thus, fertility was held constant in the projections although there is some likelihood that it may begin decreasing before 1980, particularly in Mexico. According to the "medium" variant of the regional projection, the increase in the region's population from 1960 to 1980 would be 93 per cent and though it would continue accelerating, the momentum of acceleration would diminish in the 1970's if, as assumed for this variant, a slow decrease in the regional average fertility were to begin then.

6. Variant and long-range projections

The trends and structure of the population of Mexico have hitherto been close to the regional average; hence, little error would have been likely to be incurred in deriving regional population projections by simple pro-rating of projections for Mexico. It is probable, however, that average mortality in the smaller republics of Central America is slightly above that of Mexico, lower in Costa Rica and Panama but markedly higher in Guatemala. Accordingly, for the purpose of the projection, it was assumed that expectation of life at birth in the region as a whole amounted to 57.6 years in 1960-1965. Average fertility in the region, however, is probably nearly the same as in Mexico; hence, the sex-age adjusted birth rate was assumed to be 48.0 per 1,000 as of 1960, as estimated for Mexico. Because of the similarity in past trends, the projection was calculated from the data on age composition of Mexico's population in 1960.

For the "high", "low" and "medium" variants, it was assumed that the expectation of life would continue rising rapidly until 1975-1980 and more slowly thereafter so as to attain 70.2 years during 1995-2000 period. A fertility decline was assumed for all three variants and the date of onset of the decline was taken to be 1980 for the "high", 1965 for the "low", and 1970 for the "medium" variant. In the "high" and "low" variants, it was assumed that the decline would proceed in conformity with the generalized assumption, but for the "medium" variant, as in Tropical South America, the assumption was that 45 years would elapse before the sex-age adjusted birth rate could be halved. The results of the three variant projections are shown in annex 3, table A3.8.

The slightly higher mortality and small emigration (15,000 a year until 1980, and fewer thereafter) assumed in all three variants cause little reduction in the rate of population growth; moderation of this rate would depend mainly on the date of onset of fertility decline. A peak rate of growth would be passed before 1980 according to the three assumptions and, depending on the variant, the population at the end of the century would be between three and four times its size in 1960.

¹¹ According to Z. L. Recchini, "Proyección de la Población de México por sexo y grupos de edades: 1960-1980" (CELADE, 1963) (mimeographed).

¹² Z. L. Recchini, *ibid.* Berta E. Barrios and Haroldo Ruiz, "Breve análisis de la situación demográfica de Guatemala en 1950 y proyecciones de la población entre 1950 y 1980" (CELADE, 1960) (mimeographed). Hildebrando Araica, "Proyección de la población de la República de Panamá: años 1950-1980" (CELADE, 1960) (mimeographed).

¹³ Calculated at the request of the Government.

¹⁴ *The Population of Central America (including Mexico), 1950-1980* (United Nations publication, Sales No.: 54.XIII.3); Economic Commission for Latin America, *Human Resources of Central America, Panama and Mexico, 1950-1980, in relation to some Aspects of Economic Development* (United Nations publication, Sales No.: 60.XIII.1).

TABLE 16.3
Crude birth rates, death rates and rates of natural increase in Argentina and Chile, 1920-1962
(Per 1,000 population)

| Period | Argentina | | | Chile | | |
|----------------------------------|------------|------------|--------------------------|------------|------------|--------------------------|
| | Birth rate | Death rate | Rate of natural increase | Birth rate | Death rate | Rate of natural increase |
| 1920-1924 | 32.0 | 14.4 | 17.6 | 42.4 | 30.3 | 12.1 |
| 1925-1929 | 29.9 | 13.3 | 16.6 | 41.9 | 25.8 | 16.1 |
| 1930-1934 | 26.8 | 11.6 | 15.2 | 40.5 | 23.9 | 16.6 |
| 1935-1939 | 24.0 | 11.6 | 12.4 | 36.6 | 23.3 | 13.3 |
| 1940-1944 | 24.1 | 10.3 | 13.8 | 36.4 | 19.8 | 16.6 |
| 1945-1949 | 25.1 | 9.6 | 15.5 | 35.7 | 17.2 | 18.5 |
| 1950-1954 | 25.1 | 8.7 | 16.4 | 33.8 | 13.6 | 20.2 |
| 1955-1959 | 24.0 | 8.6 | 15.4 | 36.0 | 12.6 | 23.4 |
| 1960-1962 ^a | 22.3 | 8.1 | 14.2 | 34.8 | 12.0 | 22.8 |

^a Includes provisional figures for 1961 and 1962.

C. TEMPERATE SOUTH AMERICA

Statistical documentation of population trends in Temperate South America includes a long series of decennial censuses in Chile, the Argentinian censuses of 1914, 1947 and 1960, and those of Paraguay in 1950 and 1962. A long interval lapsed between the Uruguayan censuses of 1908 and 1963, and provisional results for 1963 suggest that in recent years the population of that country was probably over-estimated. The registration of vital statistics is believed to have been substantially accurate for some time in Argentina, Chile and Uruguay, but not in Paraguay.

1. Population growth, 1920-1960

The decennial population estimates for 1920-1960 shown in annex 3, table A3.8, are official estimates except for Uruguay, where unofficial estimates from a recent study were substituted.¹⁵ The forty years' gain in the regional population was 120 per cent, and the rate of gain was particularly high in the 1920's, when there was much immigration to Argentina and Uruguay. The regional rate fell off in the 1930's when rates of natural increase diminished and immigration came to a halt, and then accelerated gradually in the 1940's and 1950's.

In Chile, where population grew chiefly by natural increase, the increments were larger from each decade to the next; this was the country of the region where population grew most slowly in the 1920's and most rapidly in the 1950's. Argentina had an exceptionally large population gain in the 1920's because of immigration followed by more moderate gains despite a temporary revival of immigration around 1950. Paraguay, a country from which there has been considerable emigration in recent years, gained about one quarter in population during each of the four decades. Except for the effects of immigration in the 1920's, Uruguay's population has become less than that of the other countries. In the forty years, the population of Paraguay grew to 2½ times its initial size, that

of Argentina 2½ times, that of Chile 2 times, and that of Uruguay about 1½ times.

2. Fertility and mortality

Birth rates, death rates and rates of natural increase in Argentina and Chile are shown in table 16.3. While the record of vital events may have been equally accurate in Uruguay, the uncertainty of population estimates during the long intercensal period makes it difficult to calculate reliable rates for that country. It has been estimated that about 3 per cent of the births in Argentina, and 5 per cent in Chile, still escape registration, and it is possible that a slight deficiency also subsists in the registration of deaths.

In Argentina, a decline from previously much higher birth rates began before the turn of the century, and a level below 30 per 1,000 was attained in the 1920's and below 25 per 1,000 in the 1930's. From about 1935 to 1958, the birth rate remained mostly within the narrow range of 24 to 25, but between 1958 and 1962 it decreased again to nearly 22 per 1,000. The decrease in Argentina's death rate, also from a previously much higher level, was rapid in the 1920's; though still continuing, it has slowed down, partly because with its decreased fertility the population is aging. In the 1920's and 1930's, the birth rate decreased faster than the death rate so that the rate of natural increase was reduced, but as the birth rate was relatively stabilized and the death rate continued diminishing, natural increase was raised somewhat in the 1950's. The recent trends and levels of Argentine birth and death rates resemble those of Northern America, Australia and New Zealand. In all these instances, the nearly constant birth rates noted in the 1950's imply a gradual rise of fertility of women of child-bearing ages, whose proportion in the total population has been reduced as a consequence of previous trends. As the expectation of life in Argentina as of 1960 probably surpassed 65 years and may soon approach 70 years, only small further decreases can be expected in the crude death rate.

A smaller decrease in the birth rate, also from a previously higher level, occurred in Chile in the 1920's and

¹⁵ A. Cataldi, *La situación demográfica de Uruguay en 1957 y proyecciones a 1982* (CELADE, Santiago, Chile, May 1963).

1930's, with fluctuations but no consistent trend following 1935. The rate dipped below 35 per 1,000 during a few years about 1950, rose again to 36.9 in 1957, and fell once more below 35 in 1961 and 1962. The death rate, still very high about 1920, decreased fairly steadily until 1950-1954, but more slowly since then. The net result has been a fairly continuous rise in natural increase, from a rate lower than that of Argentina during the 1920's to a considerably higher rate in recent periods. The Chilean population trend is rather unlike the trends in most countries, as there are few instances of a declining trend in the birth rate having been halted at so high a level. This peculiarity may be due to the persistence of high fertility, also comparatively high mortality, among certain segments of the population; the relatively high rate of infant mortality in Chile, while generally mortality has been much reduced, may also in part be accounted for in this way.

Birth and death rates have been estimated in a provisional study for Uruguay¹⁶ and it was found that their past trend closely paralleled that of Argentina; in each period, both the birth rate and the death rate calculated for Uruguay fell somewhat below the Argentine rates, as did also the rate of natural increase.

Although registration in most parts of Paraguay is unreliable, data for 1950, derived from reports for municipalities where registration was believed to be complete, indicated a birth rate of 46.6 per 1,000 and a death rate of 10.6 per 1,000. Data on the age composition of the population are consistent with such a high birth rate and suggest little variation in the past. The recorded rate of population growth in Paraguay, however, suggests that the country's average death rate may have been higher than the estimate for the selected municipalities in 1950, though ample allowance must be made for unrecorded emigration.

As a weighted average of available data and estimates, the regional sex-age adjusted birth rate in 1960 was estimated at approximately 27 per 1,000, corresponding to a regional average of 1.7 for the gross reproduction rate. Expectation of life at birth, by 1960, probably surpassed 65 years in Argentina and Uruguay, amounted to about 57 years in Chile, and probably much less in Paraguay. The regional crude death rate in 1960 was estimated as about 10 per 1,000, and the average regional expectation of life at birth as about 62 years.

As in other parts of the world, fertility in some parts of this region is likely to decline, although it is already comparatively low in most of Argentina and Uruguay. But a further decrease in the average level of fertility may also be indicated for the near future in these two countries for, as has been noted, the crude birth rate of Argentina has recently decreased, though only for a few years and by small amounts. On the other hand, considering the wide long-term fluctuations which have occurred in the birth rates of Northern America and Oceania, appreciable changes from recent trends may also occur in this region.

For a majority of the region's population, mortality is now low, but relatively high mortality persists in some areas, leaving scope for a further reduction of the average level. Because of the rising proportion of aged persons,

however, large decreases in the crude death rate are not to be foreseen.

3. Migration

Relatively large migratory gains have accrued to this region, and especially to Argentina during the 1920's. Since the migration statistics are mostly limited to arrivals and departures at the principal ports of entry, the balance of movements is not fully accounted for.

The Argentine statistics recorded a net balance of immigration of more than 900,000 persons in the 1920's. A peak rate of net immigration occurred in 1923, amounting to 17 per 1,000, almost as high as the rate of natural increase at the time. The rate subsided gradually to less than 7 per 1,000 in 1930, and to almost negligible figures in most years from 1931 to 1947, partly because of the economic depression, and later also because of the shortage of transport during the war. A large wave of immigration occurred during 1948-1951, bringing a net gain of almost 600,000, but as overseas immigration dwindled after 1952 and out-movements increased, balances in most subsequent years were much smaller. In recent periods, however, there has been a steady immigration into Argentina from neighbouring countries, part of it unrecorded.

The statistics for Chile record only small migratory balances. The net inward balance for the entire period from 1920 to 1960 amounted to less than 100,000, and in recent years there has been a slight outward balance. In Uruguay, according to the statistics, the migratory gain from 1920 to 1960 amounted to more than 350,000 but there are doubts whether the outflow of migrants, e.g., some of the movements to Argentina, was fully registered. The recorded balances reflect fluctuations parallel with those of Argentina, but in Uruguay the temporary revival of immigration around 1950 appears to have been comparatively small.

There are no such comprehensive migration statistics for Paraguay, but the censuses and migration statistics of Argentina give evidence of much Paraguayan emigration, particularly in recent years. The same inference follows from the observation that the population estimates and recent censuses of Paraguay show no acceleration of population growth, though the death rate has probably diminished.

To predict future migration in any region is hazardous and all the more so in Temperate South America in view of the wide fluctuations during the last few decades. This is a region of traditional European overseas settlement and its close ties, especially with Southern European countries, would encourage further immigration from there at times of economic opportunity. On the other hand, overseas emigration from Europe has been generally in a decline and does not seem likely to rise again to the proportions of earlier decades. Furthermore, Governments in Temperate South America have become increasingly selective in their immigration policies, endeavouring to attract migrants possessing skills that are in short supply; the result of this selectivity is likely to be a restriction on the numbers of immigrants admitted. Still, under favourable economic conditions, probably a modest balance of immigration is to be expected on the average of future periods. Movements within the region, such as

¹⁶ A. Cataldi, *op. cit.*

migration from Chile, Uruguay and Paraguay to Argentina, are likely to persist without affecting the regional balance.

4. Projections for countries, 1960-1980

A previous United Nations population projection for Argentina, still considered pertinent, was adapted for the present purpose.¹⁷ Projections for Chile and Uruguay had been prepared at the Latin American Demographic Centre.¹⁸ No suitable projection being available for Paraguay, a model was substituted.¹⁹ The population of the Falkland Islands was assumed at a constant figure. Since the projections for Chile and Uruguay had been calculated for dates other than 1960, 1965 and so forth, interpolations with respect to those dates were made for the present purpose.

The projections are not strictly comparable, as they were calculated by different authors at different times. Expectation of life (both sexes) in 1960 was estimated as 68.5 years for Uruguay, 65.5 years for Argentina, 57 years for Chile, and 45 years for Paraguay, and the assumed future gains varied. Relatively small gains were assumed for Argentina and Uruguay, a gain of two years per five-year period in Chile, and a gain of 2.5 years per five-year period in Paraguay.

The gross reproduction rate was estimated as 1.47 in Argentina (sex-age adjusted birth rate of 23.9 per 1,000), 2.34 in Chile, 1.34 in Uruguay, and 3.0 in Paraguay, and assumed to remain constant at these levels from 1960 to 1980, except for a decline in the Chilean rate from 2.34 in 1960 to 2.11 in 1980 (this being a modification of the original projection).

The projections imply a continued inward migratory balance in Argentina as large as that calculated for 1955-1960 but no migration in Chile, Paraguay and Uruguay, though it is known that there has recently been some net emigration from those countries, as also from Bolivia, to Argentina.

The results of these projections are summarized in table A3.8, annex 3, together with the "medium" variant of the long-range projection for the region. Somewhat smaller population growth is indicated by the "medium" variant than by the sum of projections for the countries, partly because a smaller amount of immigration into the region is assumed for the "medium" variant for the sake of balance with the migration assumptions for other regions of the world. From 1960 to 1980, the sum of the country projections shows an increase of 45 per cent, as compared with a gain of 41 per cent in the "medium" variant. A gain of 25 per cent is projected for Uruguay, 38 per cent for

Argentina, 62 per cent for Chile, and 73 per cent for Paraguay. The gain anticipated in Paraguay would be smaller if the recent emigration were assumed to continue. Because of changes in age composition and the assumed slight decrease of fertility in Chile, the projected rates of population increase in most countries of the region tend to diminish in the course of time, though the population model representing Paraguay implies a rise in the rate of natural increase. A gradually diminishing rate of population growth appears also in the "medium" projection calculated for the regional total.

5. Variant and long-range projections

For the "high", "low" and "medium" variants of the long-range projections, it was assumed that the average expectation of life for this region would rise from 63.2 years in 1960-1965 to 68.2 years by 1980-1985 and pass beyond 70 years after 1990. A migration assumption was also introduced, namely, annual net immigration averaging 40,000, to continue until 1980 and then diminish gradually until there would be no further migratory balance by the end of the century.

The variants were distinguished by different fertility assumptions. For the "high" assumption, the sex-age adjusted birth rate, 27.0 per 1,000 as of 1960, was maintained constant; this would be consistent with a decrease in fertility in the areas where it is high being offset by a small rise of fertility in most of Argentina and Uruguay, where it is comparatively low. For the "low" variant, a considerable decrease in the average regional fertility was assumed, bringing the sex-age adjusted birth rate down to 18.9 per 1,000 by 1975, a level to be maintained thereafter. For the "medium" assumption, the decrease of fertility was assumed to be slower and smaller so that the sex-age adjusted birth rate would be reduced to 21.6 per 1,000 by 1985 with no further change afterward. These alternative assumptions were drawn up rather freely by averaging the approximate effects of the fertility changes in Argentina and other countries of the region which would be consistent with corresponding assumptions for other areas where circumstances are similar.

The results of the variant projections up to 2,000 are shown in tables A3.2 to A3.4, annex 3. On the "high" variant the regional population total would double within the forty years. The population gain would be about two-thirds if fertility should decline as much as assumed for the "low" variant, and it would be 85 per cent if average fertility in the region should decline moderately, as assumed for the "medium" variant. A diminishing rate of growth in future decades is indicated by all three variants, and proportionate increases as large as those of the 1920's and 1950's would not be repeated in any future decade.

D. THE CARIBBEAN

In this region of islands, some large and others small, demographic trends have been diverse and unequally well documented. Censuses have been taken periodically in most of the islands, but the accuracy of some is in doubt: enumeration may have been deficient in the Dominican Republic in 1920 and excessive in the censuses of Martinique and Guadeloupe up to 1936; the Haitian census of

¹⁷ *The Population of South America, 1950-1980* (United Nations publication, Sales No.: 55.XIII.4). The adaptations consisted in assuming a sex-age adjusted birth rate 2 per cent higher than that of the "medium" assumption in the original; and assuming migratory balances as recorded during 1950-1955, and net annual immigration of 55,000 for periods subsequent to 1955, using the model calculation of the effects of migration provided in the original.

¹⁸ H. Gutiérrez and J. Morales, *Proyección de la población de Chile por sexo y Grupos de edad, 1952-1982* (CELADE, Santiago, Chile, 1961) (mimeographed).

A. Cataldi, *op. cit.* Cataldi's estimate differs from the provisional result of the 1963 census by about 1.5 per cent at that date.

¹⁹ See model DE in *The Future Growth of World Population*, (United Nations publication, Sales No.: 58.XIII.2), p. 65. The Model was adjusted to coincide with the provisional result of the 1962 census.

1918-1919 was defective and that of 1950 omitted large numbers of children if not also adults. Vital statistics are believed to be quite accurate in most of the smaller islands but their accuracy is dubious in the Dominican Republic and inadequate for demographic study in Cuba and Haiti. In the smaller islands, where migration can be a relatively large factor, population trends are sometimes erratic.

1. Population growth, 1920-1960

According to official data supplemented with independent estimates, the regional population totalled less than 10 million in 1920 and more than 20 million in 1960, as shown in table A3.8, annex 3. Within those forty years, population in the Dominican Republic grew to $2\frac{2}{3}$ times the initial numbers, Cuba and Trinidad and Tobago more than doubled, Haiti perhaps also nearly doubled, Puerto Rico and Jamaica increased by four-fifths, and the smaller islands gained less, except for a comparatively large gain in the Netherlands Antilles. The regional population as a whole grew steadily by about one-fifth in each decade while the rates of growth accelerated in some areas and diminished or fluctuated in others. The large gain in Cuba in the 1920's was partly a result of immigration and Puerto Rico's small gain in the 1950's was largely caused by emigration. Much of the population gain in the Netherlands Antilles in the 1930's and 1940's was migratory, while in other areas various fluctuations occurred through the interplay of changing rates of natural increase and changes in the volume or direction of migration.

2. Fertility

Demographic trends in Cuba, Haiti and the Dominican Republic, which contain two-thirds of the region's population, are unreliably documented but can be estimated from census data. In Haiti and the Dominican Republic, the crude birth rates appear to have been of the order of 45 per 1,000 and to have varied little in the past, but the estimates are not dependable, particularly for Haiti. In Cuba, the crude birth rate, according to calculations, may have exceeded 50 per 1,000 early in the century and decreased to about 35 per 1,000 or slightly less in the 1930's; it apparently changed little thereafter, though there are

no data for years after 1953. Gross reproduction rates have been estimated from latest available data as 2.1 in Cuba, 2.8 in Haiti, and 3.2 in the Dominican Republic.

The crude birth rates registered in some of the smaller islands (comprising 28 per cent of the region's population) are shown in table 16.4. Part of the decline of the birth rate in Puerto Rico since 1950 may be due to modified age composition as a result of emigration. Small decreases in the birth rate are noted also in Barbados and the Netherlands Antilles. In most of the remaining areas, on the other hand, the birth rates rose, reaching a peak towards the end of the 1950's and in Jamaica and the Windward Islands the rise was quite large. Among the possible explanations for the rise are the improvement of public health and a tendency towards increased stability of conjugal unions. For 1960, the gross reproduction rate is estimated at 2.8 in Trinidad and Tobago, Martinique and Guadeloupe, 2.7 in Jamaica, and 2.3 in Puerto Rico. For the combined population of the Caribbean region, the gross reproduction rate 1960 may have been of the order of 2.5, and the average birth rate about 38 or 39 per 1,000.

3. Mortality

Recent trends and levels of mortality are difficult to assess for Cuba, Haiti and the Dominican Republic owing to the lack of dependable vital statistics. The Economic Commission for Latin America estimated the crude death rate of Cuba in 1955-1960 at about 9-13 per 1,000, that of Haiti at 20-28, and that of the Dominican Republic at 16-20 per 1,000.²⁰ Such estimates would be consistent with estimated birth rates and rates of natural increase. They would imply an expectation of life at birth (both sexes) of 56-62 years in Cuba, 44-50 years in the Dominican Republic, and 36-45 years in Haiti.

In the smaller islands where death registration is more accurate (see table 16.5), death rates greater than 20 per 1,000 generally prevailed in the 1920's, falling to 15 per 1,000 and below after 1945, and recently to 10 per 1,000 and below. Very low death rates in the Netherlands

²⁰ *Economic Bulletin for Latin America* (Statistical Supplement), vol. VII, No. 1, (Santiago, Chile). (October 1962).

TABLE 16.4
Crude birth rates in selected areas of the Caribbean region, 1930-1962
(Per 1,000 population)

| Period | Puerto Rico | Jamaica | Trinidad and Tobago | Windward Islands | Barbados | Netherlands Antilles | Leeward Islands ^a |
|---------------------|-------------|---------|---------------------|------------------|----------|----------------------|------------------------------|
| 1930-1934 | 40.6 | 33.6 | 30.3 | 35.0 | 32.8 | 35.6 ^b | 34.7 |
| 1935-1939 | 39.1 | 32.2 | 32.4 | 33.4 | 32.2 | 33.7 | 34.8 |
| 1940-1944 | 39.6 | 31.5 | 36.2 | 31.4 | 32.1 | 32.9 | 33.4 |
| 1945-1949 | 41.0 | 31.2 | 38.7 | 36.1 | 32.1 | 34.0 | 34.3 |
| 1950-1954 | 36.6 | 34.0 | 37.7 | 38.4 | 32.6 | 34.9 ^c | 35.6 |
| 1955-1959 | 33.7 | 39.3 | 38.3 | 44.3 | 31.2 | 34.4 | 38.6 |
| 1960 | 31.7 | 43.1 | 38.9 | 46.2 | 33.8 | 34.9 | 35.7 |
| 1961 | 31.0 | 41.0 | 32.0 | 43.0 | 28.6 | 33.6 | 32.3 |
| 1962 | 31.1 | 40.8 | 36.0 | 42.0 | 29.6 | 33.1 | 31.1 |

^a Not including Virgin Islands.

^b 1933-1934.

^c Not including 1952.

TABLE 16.5
Crude death rates in selected areas of the Caribbean region, 1930-1962
 (Per 1,000 population)

| Period | Puerto Rico | Jamaica | Trinidad and Tobago | Windward Islands | Barbados | Netherlands Antillas | Leeward Islands ^a |
|---------------------|-------------------|---------|---------------------|-------------------|----------|----------------------|------------------------------|
| 1930-1934 | 21.1 ^b | 18.1 | 18.9 | 15.7 ^b | 24.1 | 13.9 | 20.6 |
| 1935-1939 | 19.1 | 16.6 | 16.6 | 15.8 | 20.6 | 11.1 | 20.2 |
| 1940-1944 | 16.3 | 14.7 | 16.2 | 16.6 | 17.9 | 10.2 | 18.5 |
| 1945-1949 | 12.2 | 13.5 | 13.2 | 15.8 | 16.1 | 7.0 | 15.5 |
| 1950-1954 | 9.0 | 11.3 | 11.3 | 14.7 | 13.3 | 5.5 | 12.8 |
| 1955-1959 | 7.1 | 9.6 | 9.6 | 11.2 | 10.5 | 5.2 | 12.5 |
| 1960 | 6.7 | 9.7 | 7.8 | 11.1 | 9.2 | 5.5 | 13.6 |
| 1961 | 6.7 | 9.0 | 7.9 | 10.3 | 10.2 | 4.8 | 12.2 |
| 1962 | 6.7 | 9.0 | 7.7 | 11.0 | 9.1 | 4.7 | 9.1 |

^a Not including Virgin Islands.

^b 1932-1934.

Antilles partly reflect the age composition of a population which has largely been built up by immigration. For the opposite reason, the crude death rates in the Windward and Leeward Islands have remained comparatively high. High expectations of life at birth (both sexes) have been calculated from more or less recent data: almost 70 years in Puerto Rico in 1960, about 62 years in Trinidad and Tobago in 1957, and 57 years in Jamaica in 1950-1952. The expectation in Jamaica is probably much higher now in view of the further decrease in the death rate.

There is an extreme diversity of mortality conditions in the region, some of them subject to rapid change. By 1960, the regional expectation of life may have exceeded fifty years and the regional average death rate may have dropped to the vicinity of 15 per 1,000.

4. Migration

Migration has affected population growth in particular islands of the region at various times, as there has been much inter-island migration and also some migration between this and other regions. Some immigration to Cuba in the 1920's came from overseas. Puerto Rico lost many migrants to the United States in the 1940's and still more in the 1950's, and in the latter part of the 1950's there was some migration from Jamaica and other islands to the United Kingdom. In the most recent years, both these migratory currents have diminished. There has recently been an extraordinary migration from Cuba to the United States, probably involving more than 100,000 persons, but this is not likely to continue.

In view of past tendencies, further emigration from Puerto Rico, Jamaica and smaller islands may be expected for some time in the future. But these movements are sensitive to changes in economic and other conditions and unlikely to continue on a large scale.

5. Projections for countries, 1960-1980

Population projections for Cuba, Haiti and the Dominican Republic had been published by the Economic Commission for Latin America.²¹ In these projections,

²¹The projection for Cuba was that calculated by the Economic Commission for Latin America (hypothesis A). That for Haiti was prepared by J. Saint-Surin and that for the Dominican Republic by R. Mellon, both at the Latin American Demographic Centre, Santiago, Chile.

mortality was assumed to decline in accordance with the sequence of United Nations model life tables, fertility being assumed to remain constant except in Cuba, where rural fertility — still high as compared with urban — was assumed to decline. Population projections prepared by various methods for most of the remaining areas of the region were presented by the delegations from the respective areas at a regional population conference in 1957.²² The several projections adopted, as pro-rated to agree with population estimates for 1960 and extrapolated in some instances, are shown in table A3.8, annex 3. A further adjustment was made in the projection for Puerto Rico, initially calculated with the assumption of an annual outward migratory balance of 50,000, such as actually occurred on the average of the period from 1950 to 1956; since emigration subsequently diminished and the net balance averaged 17,000 during 1957-1963, the adjustment implied a net emigration of 15,000 per year from 1960 onward. The estimates entered in table A3.8 for the Bahama Island, and other islands of still smaller population, are rough extrapolations.

The sum of these projections indicates an increase from 20 million in 1960 to 32 million in 1980. This includes doubling of the population in the Dominican Republic, increases of two-thirds in Haiti and in Trinidad and Tobago, one-half in Cuba, and one-third in Jamaica and in Puerto Rico. Population growth would accelerate in Haiti and the Dominican Republic while in other areas, where decreases of fertility are anticipated, it would tend to slow down somewhat.

6. Variant and long-range projections

As stated above, the regional average of the gross reproduction rate about 1960 was estimated as 2.5 and the average expectation of life at birth (both sexes) as slightly more than 50 years. The long-range projection began with a population model of such age composition in 1960 as would have resulted if these levels of fertility and

²² Caribbean Commission, *The Demographic Problems of the Area served by the Caribbean Commission: Second Subject — Projections* (prepared for the Technical Conference on the Demographic Problems of the Area served by the Caribbean Commission, Port of Spain, Trinidad, 25 July-2 August 1957).

mortality had prevailed over an indefinite past period.²³ Though this is a gross simplification under the diverse conditions found among areas in this region, the "medium" variant of the projection carried out on this basis gave results closely similar to the sum of available projections for individual countries.

For the "high", "low" and "medium" variants, the mortality assumption adopted was somewhat less optimistic, in view of the fact in some areas mortality is already so low that it is not likely to be very greatly reduced while in some other areas, notably Haiti, much progress still remains to be made. The assumption was adopted that the regional expectation of life would surpass 60 years in 1985-1990 and reach 65 years by the end of the century.

The likelihood of some continued emigration from the region was taken into account. The assumption was an

²³ As shown by theoretical calculations, the age composition of a population reflects recent mortality conditions to a greater extent than those of past periods. The use of the theoretical model was suggested by the fact that there were no recent data on age composition of the population in Cuba and Haiti, two countries which contain more than one half of the region's total population.

average annual net emigration of 25,000 persons—presumably migrating mostly to the United States—up to 1980, whereafter the migratory balance would diminish progressively so as to disappear by the year 2000.

The "high", "low" and "medium" variants differed in respect of the fertility assumptions. These were drawn up in the same manner as for Middle America mainland. In the "high" variant, substantial fertility decline was assumed not to set in until after 1980; in the "low" variant, the date of onset of the decline was taken to be 1965 and fertility would be halved by 1995. In the "medium" variant, the fertility decline was assumed to begin in 1970 and would take 45 years before the sex-age adjusted birth rate is halved.

The results of the variant projections are shown in tables A3.2 to A3.4, annex 3. The population of the region would increase to twice or two-and-a-half times its size within the forty-year period 1960-2000. The regional population will probably grow faster during the 1960's than it did in past decades and equally rapid, or even faster, growth may continue for several decades.

Chapter 17 OCEANIA

A. AUSTRALIA AND NEW ZEALAND

1. Population growth, 1920-1960

As shown by the data in table A3.8, annex 3, the population increased at nearly the same speed in Australia¹ and New Zealand during each decade from 1920 to 1960, though the rates fluctuated widely from one decade to another. Growth was rapid in the 1920's, comparatively slow in the 1930's, considerable again in the 1940's, and still more rapid in the 1950's. In the forty-year period, the population of each country increased by 91 per cent.

2. Fertility and mortality

Crude birth and death rates for Australia and New Zealand are shown in table 17.1. In both countries, the birth rate had been decreasing from previously much higher levels until rates of about 17 per 1,000 were re-

ched in the 1930's. Subsequent recovery brought the birth rate of Australia to about 23 and that of New Zealand to about 25 per 1,000, and these rates have been maintained since about 1945 with very little change. Because of changes in the age composition of the population, the trend of fertility at reproductive ages is not well reflected by these rates. Early in the 1920's, the gross reproduction rate in Australia was about 1.5; it fell to near 1.0 in the 1930's, rose again to 1.5 about 1950, and rose further to 1.7 by 1960. In New Zealand, the gross reproduction rate averaged 1.4 in the 1920's, fell to 1.1 in 1935-1939, but lately rose much higher, attaining almost 2.0 in 1960. The Maori population of New Zealand has high fertility, its birth rate fluctuating mostly in the range of 44-48 per 1,000 without a clear trend; in 1960, the Maori birth rate was 46.4 per 1,000.

A youthful age composition was inherited from earlier periods of high fertility and high rates of immigration and, mortality conditions being very favourable, the crude death rates have been quite low in both countries since the early part of this century. While the proportion of aged persons has increased, age-specific death rates have been reduced with the net result that nearly the same crude

¹ The population of Australia includes a constant figure of 40,000 for full-blooded aborigines, as enumerated and partly estimated in 1961; there is no reason to believe that their number has changed much in recent decades.

TABLE 17.1
Crude birth and death rates in Australia and New Zealand, 1920-1962
(Per 1,000 population)

| | Birth rate | | Death rate | | Rate of natural increase | |
|---------------------|------------------------|--------------------------|------------------------|--------------------------|--------------------------|--------------------------|
| | Australia ^a | New Zealand ^b | Australia ^a | New Zealand ^b | Australia ^a | New Zealand ^b |
| 1920-1924 | 24.4 | 23.0 | 9.8 | 9.0 | 14.6 | 14.0 |
| 1925-1929 | 21.6 | 20.2 | 9.4 | 8.6 | 12.2 | 11.6 |
| 1930-1934 | 17.6 | 17.5 | 8.8 | 8.3 | 8.8 | 9.2 |
| 1935-1939 | 17.2 | 17.4 | 9.6 | 9.0 | 7.6 | 8.4 |
| 1940-1944 | 19.5 | 21.4 | 10.8 | 9.9 | 8.7 | 11.5 |
| 1945-1949 | 23.1 | 25.1 | 9.9 | 9.5 | 13.2 | 15.6 |
| 1950-1954 | 23.0 | 24.5 | 9.4 | 9.2 | 13.6 | 15.3 |
| 1955-1959 | 22.6 | 24.9 | 8.8 | 9.1 | 13.8 | 15.8 |
| 1955 | 22.6 | 24.9 | 8.9 | 9.0 | 13.7 | 15.9 |
| 1956 | 22.5 | 24.7 | 9.1 | 9.0 | 13.4 | 15.7 |
| 1957 | 22.9 | 24.8 | 8.8 | 9.3 | 14.1 | 15.5 |
| 1958 | 22.6 | 25.2 | 8.5 | 8.9 | 14.1 | 16.3 |
| 1959 | 22.6 | 25.1 | 8.9 | 9.1 | 13.7 | 16.0 |
| 1960 | 22.4 | 25.1 | 8.6 | 8.8 | 13.8 | 16.3 |
| 1961 | 22.8 | 25.8 | 8.5 | 9.1 | 14.3 | 16.7 |
| 1962 | 22.1 | .. | 8.7 | .. | 13.4 | .. |

^a Excluding full-blooded aborigines.

^b Excluding the Maori population.

death rates, generally of the order of 9 per 1,000, have been maintained for a number of decades. In Australia, expectation of life at birth rose from about 61 years in the 1920's to 65 years in the 1930's, 68 in the 1940's, and about 70 years in 1953-1955. In New Zealand (excluding the Maori population), expectation of life was slightly higher at most of these dates, but the difference has diminished and is now almost negligible. The Maori death rate, which was 20.0 per 1,000 in 1935-1939 has fallen below 10 per 1,000 since 1954 and amounted to 8.6 per 1,000 in 1960.

3. Migration

In Australia, net immigration amounted to about 200,000 persons in the 1920's, slightly more in the 1940's, and nearly 800,000 in the 1950's; in the 1930's, by contrast, the migratory balance was almost negligible. In New Zealand, the migratory gains were about 80,000 in the 1920's, 20,000 in the 1940's, and 120,000 in the 1950's. Most of the immigrants in earlier periods came from the British Isles, but recently almost equal numbers have come from other parts of Europe, including many from Italy. Government policy has succeeded in maintaining a nearly constant flow of immigration to Australia, while the smaller flow to New Zealand has fluctuated more. New Zealand's population being about 23 per cent of Australia's, while its migratory gain in the 1950's was about 15 per cent of that of Australia, it can be said that the proportionate impact of migration on population growth has recently been somewhat larger in Australia than in New Zealand, though it has been considerable in both countries. During 1956-1960, net immigration averaged 80,000 a year in Australia and 12,000 in New Zealand.

4. Projections for countries, 1960-1980

Population projections were available for both countries, but they were not based on comparable assumptions.² In the projection for Australia, mortality was assumed to remain at the 1957-1959 level, which was already so low that only very small population gains could be expected from further reductions; fertility assumptions were varied moderately and migration assumptions were varied widely. In the variant projections calculated with different combinations of assumptions, the rate of population growth depended considerably on the assumed volume of net immigration. The latest available population projection for New Zealand assumed constant mortality as of 1950-1952, constant fertility as of 1952-1956, and annual net immigration of either 5,000 or 10,000 individuals.

The problem of assembling a consistent set of projections for Australia and New Zealand resembled the problem for the United States and Canada—countries in similar demographic situations for which the national population projections lacked comparability. The same procedure was adopted in these two cases: the available projection for the more populous country being taken as a basis and a projection for the less populous country being derived from it.

² W. D. Borrie and Ruth Rodgers, "Australian Population Projections, 1960-1975" (Canberra, Australian National University, August 1961) (mimeographed); and *New Zealand Official Yearbook*, 1962.

Because of the changing composition of European overseas migration and the apparent likelihood that it might diminish in the near future, the variant for Australia was selected in which net immigration was assumed to fall from 90,000 persons in 1960-1961 to 50,000 by 1964-1965 and then remain at that level. In the derived projection for New Zealand, it was assumed that net immigration would be in a similar proportion to New Zealand's population. The result was an assumed average annual inward balance to New Zealand of about 16,000 during 1960-1965, and of about 12,000 in the years to follow. This is not implausible since net immigration into New Zealand has fluctuated in recent years; it suddenly rose to 20,000 in 1961 and may therefore attain the average magnitude implied in the derived projection for future years.

The assumptions with respect to fertility made in the Australian projection were altered for the present purpose so that the calculations could be carried out in terms of the sex-age adjusted birth rate. As in the United States and Canada, the age composition of the population in Australia and New Zealand has changed so much that a nearly constant crude birth rate was maintained in the past fifteen years while the sex-age adjusted birth rate underwent a progressive rise, from 23.6 per 1,000 in 1950 to 26.3 in 1960 in Australia, and from 26.1 in 1950 to 30.8 in 1960 in New Zealand. The causes were probably similar to those commented upon in regard to the United States, hence future prospects may be viewed in a similar light. However, the possibility of an imminent considerable decrease in fertility has not yet come into evidence in Australia and New Zealand as it did in the United States and Canada; hence, the assumptions, roughly analogous to those in chapter 15 with respect to the United States and Canada, were formulated in a slightly modified time perspective. For Australia, it was assumed that the sex-age adjusted birth rate would undergo a linear decrease from 26.3 in 1960 to 23.4 in 1970 (average level of 1949-1951) with no change thereafter. In the derived projection for New Zealand, it was assumed that the child-woman ratio (children aged 0-4 per women aged 20-39 years) in the future would remain 20.675 per cent higher than that of Australia, as was the case in 1960.

In the original projection for Australia, mortality had been assumed to remain at the 1957-1959 level, corresponding to an expectation of life at birth (both sexes) of slightly more than 70 years. In the modified projections calculated for the present purpose, this was permitted to rise to 73.9 years by 1975, remaining at that level thereafter.

The assumptions stated above led to the future population estimates for Australia and New Zealand, separately, shown in table A3.8, annex 3. No adjustment was introduced into the calculations for the two countries separately for the sake of international comparability in assumptions as to migration. In extending the projection initially calculated to 1975, to another five-year period it was assumed that expectation of life at birth (both sexes) would then amount to 73.9 years while annual net immigration to Australia would continue to be 50,000 and to New Zealand in the corresponding proportion.

A population increase of two-fifths from 1960 to 1980 is indicated for Australia and more than one-half for New Zealand, with comparatively rapid growth in 1960-1965

and again in 1975-1980, and somewhat slower growth between 1965 and 1975. These projections, as stated, assume that immigration continues on a rather large scale. When less immigration is assumed, as on the "medium" variant for the regional projection, the projected population of the two countries combined increases by about half a million less within the twenty-year period, but the relative increase, from 1960 to 1980, is still 40 per cent.

5. Variant and long-range projections

Three variant projections of the combined population of Australia and New Zealand up to 2,000 are shown in tables A3.2 to A3.4, annex 3. The "medium" variant corresponds to the projections described above for the two countries separately, except that the assumed volume of net immigration was reduced, for the sake of comparability with projections for the regions of emigration, to 50,000 a year for both countries combined up to 1980, after which time the number was allowed to decrease to zero at the end of the century. The "high" and "low" variants were based on the same assumptions as the "medium" for mortality and migration but on different fertility assumptions. Australia's sex-age adjusted birth rate, which was 26.3 in 1960, was assumed for the "high" variant to rise to 27.0 in 1965 and then fall gradually to 25.0 by 1980, remaining constant thereafter. For the "low" variant, it was assumed to decrease steadily from the 1960 level to 18.0 by 1980, and then remain constant. The projections for New Zealand according to the three variants were derived from the Australian projections by methods analogous to those stated above.

Migration is an important factor in the population growth of Australia and New Zealand. If the migration assumption is realistic, the population of the two countries can be expected to increase by almost three-quarters, and possibly more than double, between 1960 and 2000. But the flow of migration may change considerably in response to circumstances that cannot be foreseen. Continued migration until 1980 and its slowing-down thereafter — as assumed here — would result in rather high rates of population growth within the next two decades, and these rates may be boosted further by an enlarged parental generation which will be in reproductive ages in the 1970's and 1980's.

B. MELANESIA

1. Population trends, 1920-1960

Demographic data for the greater part of Melanesia are too scant to support more than the roughest conjectures of past and future population growth. Estimates are provided here without any claim to accuracy.

Censuses have been taken in the smaller areas of the region but not in New Guinea³ or Papua. For the two latter areas, the sources of information on size of the population are vague and there is no reliable information on its changes over a period of time. Official population estimates for New Guinea and Papua were long main-

tained at constant, round figures, but recently they have been revised upward. If the evidence obtained in recent surveys⁴ in the former territory of West New Guinea (now administered by Indonesia) is any guide, the population of New Guinea and Papua is probably now growing at an appreciable rate, but there is no evidence as to the increases or decreases in earlier periods.

The sum of official population estimates for the six areas of Melanesia in 1960 was 2,166,000 and the corresponding sum of 1920 estimates was 1,478,000. The difference between these figures is a highly unreliable measure of population increase during the interval. The 1920 estimate for New Guinea, put at the round figure of one million was admittedly only a rough approximation and it is easily possible that the number of inhabitants was one or two hundred thousand greater or less. Taken at face value, the 1920 and 1960 official estimates imply an average rate of increase during the interval which is nearly the same as the rate estimated for Middle Africa. The estimated trend of population in Middle Africa was considered to be as good as any other available basis for estimating the trend of the Melanesian population total decade by decade since 1920. On this basis, and rounding the figures, it was estimated that the population of this region amounted to approximately the following numbers: 1,500,000 in 1920; 1,600,000 in 1930; 1,750,000 in 1940; 1,900,000 in 1950; and 2,166,000 in 1960. It is obvious that these estimates are quite unreliable and that they may easily be in error by several hundred thousand, but they were considered adequate to serve as approximations for inclusion in estimated population totals for Oceania.

2. Projections

On the supposition that the population of Melanesia increased little, if at all, in earlier decades but had recently begun to grow at an appreciable rate, it appeared pertinent to refer to the population projections for Middle Africa in assessing the population prospects in Melanesia. The assumption was that important reductions in mortality would get under way in Melanesia, as expected in Middle Africa, and that some rise of fertility might occur as a result of tribal controls being relaxed, at least as a "high" assumption. Admittedly, the facts as regards Melanesia are not well known, but a more pertinent basis for future population estimates did not suggest itself. By assuming that future population growth in Melanesia as a whole would parallel that in Middle Africa, and deriving estimates for particular areas by the ratio method, results were obtained as shown in the annex tables. Though this appraisal may be a misjudgement, the figures are not large and their inclusion in totals for Oceania and for the world probably introduces no large error. The calculations imply that the population of Melanesia may double, or undergo an even larger increase, within the period from 1960 to 2000.

³ Some Preliminary Results of the Demographic Research Project, Netherlands New Guinea, part I: The Beneden-Waropen, part II: Noemfoor, part III: Nimboran (The Hague, European Economic Community, Project 11.41.002, November 1962, April 1963 and July 1963). In the three areas surveyed, birth rates of 47.4, 44.0, and 46.8 per 1,000 were estimated; the rates of natural increase were estimated as 25-30, "at least 30", and "considerable".

⁴ New Guinea, as the term is used here, refers to the Trust Territory under Australian Administration, comprising the north-eastern part of the island of New Guinea.

C. POLYNESIA AND MICRONESIA

Censuses have been taken repeatedly in every territory of Polynesia and Micronesia, providing a good record of population growth over a period of several decades. Difficulties occur in the comparison of the reported totals, as some of them include and others exclude non-indigenous military and administrative personnel. Vital statistics are reported annually in most of the territories though in many of them registration is believed to be incomplete.

1. *Population growth, 1920-1960*

The population estimates for 1920 to 1960 in table A3.8, annex 3, include some interpolated from figures provided for other years. For Guam, rounded figures have been substituted for recent dates, intended to represent the indigenous population, not including United States military personnel. In the Trust Territory of the Pacific Islands (previously Japanese and now under United States administration), the immigration of Japanese settlers and their repatriation after 1945 caused a discontinuity in population growth. With those exceptions, the population in the various areas of Polynesia and Micronesia has been growing at similar and accelerating rates. Recently these rates of growth have risen very high.

2. *Fertility and mortality*

Births and deaths are registered in nearly all the territories, with varying or undetermined accuracy, but quite accurately in some. The registration data show little change in fertility and sharp reductions in mortality.

Over the past fifteen years, if not longer, birth rates somewhat in excess of 40 per 1,000 have been recorded in the Fiji Islands, American Samoa, and the Cook Islands, in the range of 35-40 per 1,000 in Western Samoa and Tonga, and in the range of 30-35 per 1,000 in the Pacific Islands (United States administration) and the Gilbert and Ellice Islands. The rates for some of these areas may have been understated.

The death rates recorded in 1945-1949⁵ and 1960, respectively, were 9.3 and 3.9 in Western Samoa, 10.5 and 4.6 in Tonga, 9.1 and 5.4 in American Samoa, 9.9 and 5.9 in the Pacific Islands (USA), 12.0 and 6.6 in the Fiji Islands, 21.4 and 8.3 in the Cook Islands, and 19.5 and 10.4 per 1,000 in the Gilbert and Ellice Islands. In several instances, the rates may reflect incomplete registration, but it is probable that the crude death rates in most territories are now in fact well below 10 per 1,000 whereas prior to 1950, they were probably in the range of 10-20 per 1,000, and higher still in earlier periods.

3. *Projections for islands, 1960-1980*

Projections were available for the combined population of the Fiji Islands, Western and American Samoa, French

Polynesia, Tonga and the Cook Islands.⁶ In these projections fertility and mortality were assumed to continue at the levels recorded in 1955-1957 and the calculation was carried out for the period from 1956 to 1971. The results showed increases of nearly 20 per cent in the combined population for each five-year period.

A wide variety of prospects can be envisaged in the individual small territories of this region. Thus, the registration data record rather sudden drops in crude death rates in a number of instances. A rapid response to social and economic change, in comparatively small social units, may cause either emigration or family limitation. Prediction is therefore difficult despite the fact that quite similar population trends have prevailed in these territories in the recent past.

The youthful age composition and the rapidity with which public health measures can be extended in a small island make it possible for crude death rates to fall very low indeed. Given a birth rate of about 40 per 1,000, the death rate becomes about 10 per 1,000 when expectation of life at birth attains 60 years and 5 per 1,000 when it reaches 70 years, so that annual population increases of 3.5 and even 4.0 per cent can well be attained. In the absence of definite indications for a prospect of emigration or fertility decline in any of the territories, the same assumption was applied to each: an increase in population by 17.5 per cent during 1960-1965 and by 20.0 per cent during subsequent quinquennia; the resulting figures shown in table A3.8. An approximate doubling of the population of each territory within a twenty-year period is suggested.

4. *Variant and long-range projections*

In a long-range view of the future prospects for the total population of Polynesia and Micronesia, continuing growth in line with present tendencies does not appear probable unless some extraordinary developments occur. Many of the islands are very small and the distances between them are very great; hence, the prospect for investments permitting a highly productive and diversified economy to be developed is dubious, though much may be done to enhance the prosperity of the small-scale economies. It is possible that economic development may be facilitated by inter-island migration leading to increased concentration of the population in the islands which are most favourably situated. Nevertheless, unavoidable limitations of economic development may cause some emigration from the region, some reduction of fertility, or both. In small areas, such tendencies may spring up rather suddenly. Unforeseeable conditions, therefore, would have limited the value of any detailed long-range projections and rough assumptions were used to obtain long-range projections for the total population of Polynesia and Micronesia combined. The variants shown in annex 3, tables A3.2 to A3.4 were calculated from freely assumed decennial growth rates. It is admitted that this was done rather arbitrarily.

⁵ Or for an average of those years for which data are available.

⁶ N. MacArthur, *Journal of the Polynesian Society*, vol. 70 (Wellington, 1961), pp. 393-400.

ANNEXES

Annex I

THE AUXILIARY VARIANT, "CONSTANT FERTILITY, NO MIGRATION"

A. ASSUMPTIONS

The two broad population types mentioned in chapter I took on their present distinct form in the 1950's. Previously, as some populations were still in a process of transition, and also owing to the disturbances caused by the war, the picture was more diverse. It may again take on greater complexity in the future.

Broadly speaking — though there are exceptions — the 1950's were marked by a near constancy in birth rates and by considerable rises in expectation of life in virtually all the world's regions. It is this situation which furnished the background for a "constant fertility, no migration" variant, results of which are tabulated in annex 3, table A3.5 for major areas and regions 1960-2000.

This variant was intended to show, for comparative purposes, what would happen if the conditions of stable fertility and declining mortality prevailing in the 1950's were to continue throughout the projection period. The assumption was made regardless of whether or not it is likely to be borne out by events. The results are significant in two ways: first, the generalization which they imply has been confirmed by the great majority of observations for all regions of the world during a decade; and second, the projections calculated on this basis provide bench-marks against which the effects of the changing trends assumed for other variants can be assessed.

The starting points of the projection for each area were the levels of the sex-age adjusted birth rate (s.a.a.b.r.) and of the expectation of life, e_0 , estimated for the year 1960 or a brief period of years preceding 1960.^a These basic estimates are quite accurate where the available statistics are reliable and up to date. In other instances, two rules were generally followed. Where available statistics were of dubious accuracy, a rounded figure was substituted, the degree of rounding being a reflection of the confidence with which the statistics were regarded. Where available data were not so recent, an up-to-date estimate was made having regard both to past trends in the region itself and to trends in other regions in similar circumstances.

The procedure of assuming constant s.a.a.b.r. while e_0 rises is simple, but the interpretation is imprecise. Ill-health can be a cause of inability to conceive or low fertility, of premature abortion, and of stillbirth. High mortality rates are a cause of frequent widowhood at reproductive age and thus of reduced fertility. Since mortality decline is associated with decreased morbidity and increased chances of survival during the reproductive years of life, the assumption of a constant s.a.a.b.r. implies an offsetting of opposite tendencies so that the rise in fertility which might occur with falling mortality, *ceteris paribus*, is held in check.

As regards the future course of the expectation of life at birth, direct use was made of the sequence of model life

tables so spaced as to represent a rate of mortality decline which could be regarded as average or typical of world conditions in the 1950's.^b Actually, mortality in some regions of the world has declined faster than in others. Very rapid mortality decline from a previously high level was facilitated in some regions from about 1945 onwards, thanks largely to new methods of disease control and a more effective organization of public health work. In other regions, where greater obstacles were presented by difficulties in transport and communications, cultural barriers, etc., the progress during the 1950's was less rapid. Finally, in some regions where expectation of life was already very high in 1950, further progress was naturally rather slow.

For the "constant fertility, no migration" projection, mortality declines from 1960 to the end of the century were assumed everywhere to follow the same sequence: a gain of 2½ years in expectation of life in every five-year period until an expectation of 55 years would be attained; slightly accelerated gains from that level up to an expectation of about 65 years; and slower and slower gains from 65 years to 73.9 years. Improvements in expectations of life assumed to occur by 1980 and 2000 are shown below for a few selected initial values of expectation of life:

| | Years | | | | |
|--|-------|------|------|------|------|
| Where expectation of life in 1960 was: | 30.0 | 40.0 | 50.0 | 60.4 | 70.2 |
| In 1980 it would be: | 40.0 | 50.0 | 60.4 | 70.2 | 73.9 |
| In 2000 it would be: | 50.0 | 60.4 | 70.2 | 73.9 | 73.9 |

B. RESULTS

Table A1.1 shows, for each major area, how the results of the projections according to the "constant fertility, no migration" assumptions differ from the "medium" variant.

The calculations based on the "constant fertility, no migration" assumptions show an increase in world population by the years 2000 to 2.5 times its size in 1960. The population of Latin America would be multiplied during the 40-year interval by a factor of 3.6, Africa and South Asia by more than 3, East Asia by 2.3, Oceania, Northern America and the Soviet Union by nearly 2, and Europe by 1.3.

The world total for the year 2000 as calculated on the "constant fertility, no migration" assumptions exceeds the "medium" projection by about 1,400 millions, or approximately 23 per cent of the latter. The difference can be attributed primarily to the assumptions of declining fertility adopted in calculating the "medium" variant for many areas where fertility is high at present. In the regions where

^bThe sequence of life tables is shown in *Methods for Population Projections by Sex and Age, Manual III* (United Nations publication, Sales No.: 56.XIII.3). The use of successive tables for successive five-year periods of the projection implies, over much of the range, an annual gain in e_0 by half a year, which is typical of the 1950's.

^aExcept in mainland China, where the basic estimates had to be related to earlier periods.

fertility is moderate or low, only small changes of fertility were involved in the assumptions of the "medium" variant.

In regard to the future trends of mortality, the differences between the "medium" and the "constant fertility, no migration" assumptions are, on the whole, less important and they work in different directions for different regions. The "medium" variant assumes, for brief periods, somewhat faster declines of mortality than those taken as the basis for the "constant fertility, no migration" calculations in a few regions where the decline has recently been very rapid but mortality is still rather high, so that further reductions could be achieved at relatively moderate cost. On the other hand, in some regions the "medium" variant is predicated on slower mortality declines in the future than assumed for "constant fertility, no migration". In these cases, the rationale of the assumptions for the "medium" variant is either the high cost of further progress where mortality rates are already low, or special difficulties which have inhibited progress in some areas and which may persist in the future.

The migration assumptions adopted for the "medium" va-

riant in some regions have, of course, little effect on the projections of the world total, but these are an important part of the cause of differences between the "medium" and "constant fertility, no migration" projections for certain areas.

The differences between the two sets of projections build up slowly at first, become substantial by 1980, and then widen with increasing speed, showing that modifications of trends which have relatively small effects over short periods may entail much greater consequences in the long run. In relative numbers, the "medium" variant deviates from the "constant fertility, no migration" variant most widely in some of the areas where population is either very large or likely to grow very fast and where plausible future reductions of fertility would affect the rate of population growth most considerably. This is especially the case in East Asia and South Asia and to a considerable extent also in Latin America and Africa, though much of the difference in the case of Africa results from the assumption in the "medium" projections of a less favourable prospect for rapid reductions in mortality.

TABLE A1.1
Future population growth according to the "constant fertility, no migration" variant, compared with the "medium" variant, by major areas, 1960-2000

| Area | 1960 | 1970 | 1980 | 1990 | 2000 |
|---|-------|--------------|--------------|--------------|-------|
| <i>Population (millions), "constant fertility, no migration" variant</i> | | | | | |
| World total | 2,998 | 3,641 | 4,519 | 5,764 | 7,522 |
| East Asia | 794 | 942 | 1,143 | 1,425 | 1,811 |
| South Asia | 865 | 1,106 | 1,446 | 1,952 | 2,702 |
| Europe | 425 | 460 | 496 | 533 | 571 |
| USSR | 214 | 253 | 295 | 345 | 402 |
| Africa | 273 | 348 | 458 | 620 | 860 |
| Northern America | 199 | 230 | 272 | 325 | 388 |
| Latin America | 212 | 284 | 387 | 537 | 756 |
| Oceania | 15.7 | 18.4 | 22.0 | 26.7 | 32.5 |
| <i>Excess (millions) of "constant fertility, no migration" over "medium" variant</i> | | | | | |
| World total | | 49 | 189 | 576 | 1,392 |
| East Asia | | 32 | 102 | 257 | 524 |
| South Asia | | ^a | 26 | 169 | 531 |
| Europe | | 6 | 17 | 29 | 44 |
| USSR | | 7 | 17 | 29 | 49 |
| Africa | | 2 | 9 | 33 | 93 |
| Northern America | | 4 | 11 | 19 | 34 |
| Latin America | | 1 | 9 | 39 | 118 |
| Oceania | | ^b | ^b | ^b | 0.6 |
| <i>Proportionate excess (per 100) of "constant fertility, no migration" variant over "medium" variant</i> | | | | | |
| World total | | 1.4 | 4 | 11 | 23 |
| East Asia | | 3.5 | 10 | 22 | 41 |
| South Asia | | ^a | 2 | 9 | 24 |
| Europe | | 1.4 | 3 | 5 | 8 |
| USSR | | 2.7 | 6 | 8 | 12 |
| Africa | | 0.5 | 2 | 5 | 11 |
| Northern America | | 1.6 | 4 | 6 | 9 |
| Latin America | | 0.4 | 2 | 8 | 18 |
| Oceania | | ^b | ^b | ^b | 2 |

^a"Medium" exceeds "constant fertility, no migration" variant mainly because of a temporarily rapid mortality decline as assumed in the "medium" variant.

^b"Medium" exceeds "constant fertility, no migration" variant mainly because of assumed net immigration.

Annex II

AGE COMPOSITION OF POPULATION OF THE WORLD, MAJOR AREAS, AND REGIONS, ACCORDING TO "MEDIUM" PROJECTIONS

Table A2.1 presents in percentage form the age composition of population in each region, 1960-2000, as projected according to the "medium" variant, with totals combined for major areas and for the world. In interpreting the age data, a few qualifying observations should be borne in mind.

First, the age data refer to projections carried out on the basis of levels and assumed trends in fertility and mortality, without adjustment for migration. Though adjustments for migration were applied in some of the regional projections, this was done only in total numbers and not in terms of age groups. The "medium" variant of regional projections for Western, Southern, Eastern and Northern Europe, the Middle American Mainland, Temperate South America, and the Caribbean region had initially been calculated without migration; hence, the effects of migration on age composition are absent in the tabulations. The "medium" variants for Northern America and for the region of Australia and New Zealand, on the other hand, had been derived from available projections in which more net immigration had been assumed than was retained for this report, and an adjustment for less net immigration was applied to these. The age data for the two regions, however, retain the effects initially calculated for a somewhat larger immigration."

Secondly, for a number of regions the age composition of the population at the base date of the projection (1960) was

roughly estimated to accord with estimated levels of current fertility and mortality. For that purpose, a set of theoretical population models was used to which interpolations could be applied with respect to the particular values of fertility and mortality. It is well established that in a population where fertility has not changed much in the past, even though mortality may have changed, the age composition of the moment resembles closely that which would have resulted in a population in which current fertility and mortality levels had prevailed for an indefinite period of the past. While the initial age composition so arrived at does not faithfully represent the actual age composition in the region, the subsequent changes in age composition nevertheless reflect accurately the effects of the changes in fertility or mortality assumed in the projection.

Finally, the age composition of the population of parts of some regions was left out of account. No age composition was estimated for the populations of Israel, Cyprus, Polynesia and Micronesia, whereas in the case of Melanesia it was assumed that the age composition was the same as calculated for Middle Africa.

Qualifications pertaining to particular areas or regions are summarized in footnotes at the end of table A2.1. For further detail the reader may wish to refer to the text in the corresponding chapters of part IV.

"The simple assumptions used for the purpose are stated in chapter 9. Actually, the only region in which assumed migration is large enough in proportion to the size of the population to affect its age composition appreciably is that of Australia and New Zealand. In that case, an available projection assuming a diminishing amount of migration was used as the basis and only a slight adjust-

ment was applied in deriving the "medium" variant up to 1975. On the other hand, extensions of the projections for Northern America beyond 1980, and for Australia and New Zealand beyond 1975 were carried out by age groups without allowing for any further migration after those dates though adjustments in the projected totals were made to allow for such further migration.

TABLE A2.1

Composition of the population of the world, major areas, and regions, 1960-1980, and 2000, by broad age groups according to "medium" variant of the projections

(NOTE: Percentages were rounded to nearest decimal and, where necessary, minimal proportionate adjustments were made so that rounded percentages would total 100.0 per cent for all ages. The population of the Ryukyu Islands, Israel, Cyprus, Polynesia and Micronesia is not included, while that of Melanesia is assumed to resemble that of Middle Africa.)

| Area and age (years) | 1960 | 1965 | 1970 | 1975 | 1980 | 2000 |
|-----------------------|-------|-------|-------|-------|-------|-------|
| WORLD, TOTAL | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 14.1 | 13.8 | 13.6 | 13.5 | 13.4 | 11.5 |
| 5-14 | 22.3 | 22.9 | 22.8 | 22.5 | 22.4 | 20.9 |
| 15-24 | 17.3 | 17.2 | 18.0 | 18.4 | 18.4 | 18.4 |
| 25-44 | 25.9 | 25.8 | 25.1 | 24.8 | 25.0 | 27.2 |
| 45-64 | 15.4 | 15.1 | 15.1 | 15.1 | 15.0 | 15.6 |
| 65 and over | 5.0 | 5.2 | 5.4 | 5.7 | 5.8 | 6.4 |

TABLE A2.1 (continued)

| Area and age (years) | 1960 | 1965 | 1970 | 1975 | 1980 | 2000 |
|--|-------|-------|-------|-------|-------|-------|
| A. EAST ASIA, TOTAL | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 13.5 | 12.9 | 12.4 | 12.1 | 11.3 | 9.0 |
| 5-14 | 22.6 | 22.7 | 22.1 | 21.3 | 20.8 | 17.5 |
| 15-24 | 17.8 | 18.0 | 18.8 | 19.0 | 18.6 | 17.2 |
| 25-44 | 26.8 | 26.6 | 26.5 | 26.7 | 27.5 | 29.7 |
| 46-64 | 15.1 | 15.3 | 15.5 | 15.8 | 16.3 | 19.2 |
| 65 and over | 4.2 | 4.5 | 4.7 | 5.1 | 5.5 | 7.4 |
| 1. <i>Mainland East Asia^b</i> | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 13.9 | 13.3 | 12.8 | 12.3 | 11.6 | 9.1 |
| 5-14 | 22.5 | 23.1 | 22.6 | 21.8 | 21.2 | 17.7 |
| 15-24 | 17.7 | 17.7 | 18.7 | 19.3 | 19.1 | 17.3 |
| 25-44 | 26.7 | 26.3 | 26.0 | 26.1 | 27.0 | 30.3 |
| 45-64 | 15.1 | 15.3 | 15.4 | 15.7 | 15.9 | 18.7 |
| 65 and over | 4.1 | 4.3 | 4.5 | 4.8 | 5.2 | 6.9 |
| 2. <i>Japan</i> | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 8.4 | 7.9 | 7.5 | 8.0 | 8.0 | 6.4 |
| 5-14 | 21.5 | 17.2 | 15.2 | 14.3 | 14.4 | 12.6 |
| 15-24 | 19.2 | 20.8 | 19.6 | 15.7 | 13.8 | 14.1 |
| 25-44 | 28.6 | 30.6 | 32.5 | 34.1 | 33.2 | 25.1 |
| 45-64 | 16.6 | 17.2 | 18.3 | 20.1 | 22.0 | 28.1 |
| 65 and over | 5.7 | 6.3 | 6.9 | 7.8 | 8.6 | 13.7 |
| 3. <i>Other East Asia^c</i> | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 18.0 | 16.7 | 16.0 | 15.1 | 14.2 | 10.9 |
| 5-14 | 25.9 | 27.6 | 27.1 | 26.0 | 25.2 | 20.3 |
| 15-24 | 17.6 | 17.6 | 19.0 | 20.7 | 20.6 | 19.1 |
| 25-44 | 23.8 | 23.1 | 22.6 | 22.5 | 23.9 | 29.8 |
| 45-64 | 11.7 | 11.8 | 11.9 | 12.0 | 12.1 | 14.7 |
| 65 and over | 3.0 | 3.2 | 3.4 | 3.7 | 4.0 | 5.2 |
| B. SOUTH ASIA, TOTAL^d | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 16.8 | 16.8 | 16.7 | 16.4 | 15.8 | 12.0 |
| 5-14 | 24.3 | 25.3 | 25.7 | 25.8 | 25.8 | 22.5 |
| 15-24 | 18.4 | 17.8 | 18.2 | 18.9 | 19.3 | 20.0 |
| 25-44 | 25.1 | 24.5 | 23.8 | 23.1 | 23.2 | 27.7 |
| 45-64 | 12.3 | 12.4 | 12.3 | 12.3 | 12.3 | 13.2 |
| 65 and over | 3.1 | 3.2 | 3.3 | 3.5 | 3.6 | 4.6 |
| 4. <i>Middle South Asia^e</i> | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 16.6 | 16.8 | 16.9 | 16.7 | 15.9 | 11.2 |
| 5-14 | 24.3 | 25.2 | 25.5 | 25.8 | 26.1 | 21.6 |
| 15-24 | 18.3 | 17.8 | 18.2 | 18.7 | 19.1 | 20.4 |
| 25-44 | 25.2 | 24.5 | 23.7 | 23.0 | 23.1 | 28.7 |
| 45-64 | 12.5 | 12.5 | 12.4 | 12.4 | 12.3 | 13.5 |
| 65 and over | 3.1 | 3.2 | 3.3 | 3.4 | 3.5 | 4.6 |
| 5. <i>South-East Asia^f</i> | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 16.9 | 16.7 | 16.1 | 15.5 | 15.4 | 13.8 |
| 5-14 | 23.8 | 25.6 | 26.2 | 25.8 | 25.1 | 24.2 |
| 15-24 | 18.5 | 17.2 | 17.7 | 19.3 | 19.8 | 19.1 |
| 25-44 | 25.3 | 24.9 | 24.1 | 23.2 | 23.1 | 25.9 |
| 45-64 | 12.4 | 12.4 | 12.5 | 12.6 | 12.7 | 12.4 |
| 65 and over | 3.1 | 3.2 | 3.4 | 3.6 | 3.9 | 4.6 |

TABLE A2.1 (continued)

| Area and age (years) | 1960 | 1965 | 1970 | 1975 | 1980 | 2000 |
|---------------------------------------|-------|-------|-------|-------|-------|-------|
| 6. South-West Asia^a | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 17.4 | 16.5 | 16.8 | 17.0 | 16.7 | 13.4 |
| 5-14 | 26.3 | 26.7 | 26.0 | 25.6 | 26.1 | 23.9 |
| 15-24 | 19.2 | 19.4 | 19.5 | 19.5 | 19.0 | 20.2 |
| 25-44 | 23.4 | 23.6 | 23.7 | 23.8 | 23.9 | 25.8 |
| 45-64 | 10.8 | 10.8 | 11.0 | 11.0 | 11.1 | 12.7 |
| 65 and over | 2.9 | 3.0 | 3.0 | 3.1 | 3.2 | 4.0 |
| C. EUROPE, TOTAL^b | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 8.9 | 8.5 | 8.0 | 7.9 | 7.9 | 7.7 |
| 5-14 | 16.8 | 16.6 | 16.3 | 15.6 | 15.1 | 15.2 |
| 15-24 | 14.5 | 14.9 | 15.6 | 15.4 | 15.2 | 14.5 |
| 25-44 | 26.8 | 27.6 | 26.6 | 26.7 | 27.0 | 27.0 |
| 45-64 | 23.2 | 21.8 | 21.8 | 21.7 | 21.7 | 22.5 |
| 65 and over | 9.8 | 10.6 | 11.7 | 12.7 | 13.1 | 13.1 |
| 7. Western Europe | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 8.4 | 8.2 | 7.8 | 7.6 | 7.7 | 7.8 |
| 5-14 | 15.4 | 15.4 | 15.8 | 15.3 | 14.8 | 15.2 |
| 15-24 | 14.3 | 14.2 | 14.5 | 14.6 | 15.1 | 14.2 |
| 25-44 | 25.8 | 27.2 | 26.2 | 26.3 | 26.3 | 27.0 |
| 45-64 | 24.9 | 22.8 | 22.3 | 21.8 | 21.6 | 22.5 |
| 65 and over | 11.2 | 12.2 | 13.4 | 14.4 | 14.5 | 13.3 |
| 8. Southern Europe | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 9.4 | 9.0 | 8.4 | 8.1 | 8.1 | 7.7 |
| 5-14 | 17.7 | 17.2 | 17.0 | 16.2 | 15.5 | 15.2 |
| 15-24 | 15.6 | 15.6 | 16.0 | 15.8 | 15.6 | 14.4 |
| 25-44 | 28.5 | 29.5 | 28.4 | 28.1 | 27.5 | 27.1 |
| 45-64 | 20.6 | 20.0 | 20.7 | 21.4 | 22.2 | 22.4 |
| 65 and over | 8.2 | 8.7 | 9.5 | 10.4 | 11.1 | 13.2 |
| 9. Eastern Europe | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 9.6 | 8.6 | 8.1 | 8.1 | 8.3 | 7.7 |
| 5-14 | 18.7 | 18.6 | 17.0 | 15.7 | 15.2 | 15.3 |
| 15-24 | 14.1 | 14.8 | 17.0 | 17.1 | 15.7 | 14.9 |
| 25-44 | 26.6 | 27.6 | 26.4 | 26.4 | 27.4 | 26.9 |
| 45-64 | 22.6 | 20.8 | 20.7 | 20.7 | 21.0 | 22.6 |
| 65 and over | 8.4 | 9.6 | 10.8 | 12.0 | 12.4 | 12.6 |
| 10. Northern Europe | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 8.0 | 8.0 | 7.6 | 7.6 | 7.7 | 7.7 |
| 5-14 | 16.1 | 15.1 | 15.3 | 15.0 | 14.7 | 15.0 |
| 15-24 | 13.5 | 15.1 | 15.1 | 14.3 | 14.6 | 14.4 |
| 25-44 | 26.2 | 25.2 | 24.5 | 25.7 | 26.4 | 26.8 |
| 45-64 | 24.9 | 24.6 | 24.4 | 23.3 | 21.9 | 22.8 |
| 65 and over | 11.3 | 12.0 | 13.1 | 14.1 | 14.7 | 13.3 |
| D. 11. USSR^c | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 11.7 | 10.3 | 9.2 | 9.1 | 9.5 | 9.3 |
| 5-14 | 19.1 | 20.6 | 19.8 | 17.7 | 16.6 | 17.8 |
| 15-24 | 16.2 | 13.8 | 16.5 | 18.1 | 17.4 | 15.8 |
| 25-44 | 28.3 | 30.7 | 28.9 | 26.6 | 26.7 | 26.3 |
| 45-64 | 18.5 | 17.7 | 17.8 | 19.8 | 20.3 | 19.6 |
| 65 and over | 6.2 | 6.9 | 7.8 | 8.7 | 9.5 | 11.2 |

TABLE A2.1 (continued)

| Area and age (years) | 1960 | 1965 | 1970 | 1975 | 1980 | 2000 |
|--|-------|-------|-------|-------|-------|-------|
| E. AFRICA, TOTAL | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 17.2 | 17.1 | 17.2 | 17.3 | 17.3 | 16.4 |
| 5-14 | 25.9 | 26.0 | 26.0 | 26.0 | 26.3 | 25.9 |
| 15-24 | 19.3 | 19.4 | 19.3 | 19.2 | 19.1 | 19.5 |
| 25-44 | 24.0 | 23.9 | 23.9 | 23.8 | 23.6 | 23.8 |
| 45-64 | 10.9 | 10.9 | 10.9 | 10.9 | 10.9 | 11.2 |
| 65 and over | 2.7 | 2.7 | 2.7 | 2.8 | 2.8 | 3.2 |
| 12. Western Africa¹ | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 18.8 | 18.9 | 18.8 | 18.6 | 18.5 | 18.9 |
| 5-14 | 27.3 | 27.3 | 27.5 | 27.7 | 27.6 | 27.6 |
| 15-24 | 19.6 | 19.5 | 19.5 | 19.5 | 19.6 | 19.1 |
| 25-44 | 22.8 | 22.8 | 22.7 | 22.7 | 22.6 | 22.4 |
| 45-64 | 9.4 | 9.4 | 9.4 | 9.4 | 9.5 | 9.6 |
| 65 and over | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.4 |
| 13. Eastern Africa² | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 16.5 | 15.5 | 15.9 | 16.2 | 16.5 | 16.5 |
| 5-14 | 25.2 | 25.6 | 24.8 | 24.3 | 24.8 | 25.4 |
| 15-24 | 19.3 | 19.5 | 19.6 | 19.6 | 18.8 | 19.1 |
| 25-44 | 24.7 | 25.0 | 25.1 | 25.1 | 25.0 | 23.6 |
| 45-64 | 11.5 | 11.6 | 11.7 | 11.9 | 11.9 | 12.0 |
| 65 and over | 2.8 | 2.8 | 2.9 | 2.9 | 3.0 | 3.4 |
| 14. Middle Africa³ | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 14.7 | 15.0 | 15.4 | 15.7 | 15.9 | 16.4 |
| 5-14 | 23.4 | 23.4 | 23.5 | 23.9 | 24.3 | 25.2 |
| 15-24 | 19.0 | 18.8 | 18.6 | 18.3 | 18.2 | 18.8 |
| 25-44 | 26.0 | 25.9 | 25.6 | 25.3 | 24.8 | 23.6 |
| 45-64 | 13.4 | 13.4 | 13.3 | 13.2 | 13.1 | 12.2 |
| 65 and over | 3.5 | 3.5 | 3.6 | 3.6 | 3.7 | 3.8 |
| 15. Northern Africa⁴ | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 17.1 | 17.3 | 17.4 | 17.5 | 17.2 | 12.9 |
| 5-14 | 26.1 | 26.0 | 26.1 | 26.4 | 26.7 | 24.2 |
| 15-24 | 19.2 | 19.2 | 19.0 | 18.8 | 18.9 | 20.7 |
| 25-44 | 23.7 | 23.6 | 23.5 | 23.3 | 23.1 | 26.1 |
| 45-64 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 12.3 |
| 65 and over | 2.9 | 2.9 | 3.0 | 3.0 | 3.1 | 3.8 |
| 16. Southern Africa⁵ | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 16.6 | 16.7 | 16.8 | 16.9 | 16.9 | 14.8 |
| 5-14 | 25.6 | 25.6 | 25.7 | 25.8 | 25.9 | 26.1 |
| 15-24 | 19.1 | 19.1 | 19.0 | 18.9 | 18.9 | 19.7 |
| 25-44 | 24.1 | 24.1 | 23.9 | 23.8 | 23.7 | 24.1 |
| 45-64 | 11.5 | 11.4 | 11.4 | 11.4 | 11.4 | 11.7 |
| 65 and over | 3.1 | 3.1 | 3.2 | 3.2 | 3.2 | 3.6 |
| F. 17. NORTHERN AMERICA⁶ | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 11.4 | 10.6 | 10.1 | 10.7 | 11.2 | 10.6 |
| 5-14 | 19.9 | 20.4 | 19.9 | 18.7 | 18.7 | 19.2 |
| 15-24 | 13.7 | 15.8 | 17.4 | 17.8 | 17.2 | 17.1 |
| 25-44 | 26.2 | 24.2 | 23.4 | 24.1 | 25.6 | 26.3 |
| 45-64 | 19.8 | 19.9 | 20.0 | 19.4 | 17.9 | 17.9 |
| 65 and over | 9.0 | 9.1 | 9.2 | 9.3 | 9.4 | 8.9 |

TABLE A2.1 (continued)

| Area and age (years) | 1960 | 1965 | 1970 | 1975 | 1980 | 2000 |
|---|-------|-------|-------|-------|-------|-------|
| G. LATIN AMERICA, TOTAL^a | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 16.6 | 16.6 | 16.6 | 16.4 | 16.2 | 13.8 |
| 5-14 | 25.1 | 25.7 | 25.8 | 25.9 | 25.9 | 24.2 |
| 15-24 | 18.5 | 18.3 | 18.4 | 18.8 | 19.0 | 19.8 |
| 25-44 | 24.3 | 23.8 | 23.4 | 23.0 | 23.1 | 25.6 |
| 45-64 | 12.2 | 12.2 | 12.1 | 12.1 | 11.9 | 12.3 |
| 65 and over | 3.3 | 3.4 | 3.7 | 3.8 | 3.9 | 4.3 |
| 18. Tropical South America^a | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 17.3 | 17.4 | 17.4 | 17.2 | 16.8 | 14.0 |
| 5-14 | 25.8 | 26.3 | 26.5 | 26.8 | 26.8 | 24.8 |
| 15-24 | 19.0 | 18.5 | 18.5 | 18.8 | 19.1 | 20.0 |
| 25-44 | 23.8 | 23.4 | 23.0 | 22.5 | 22.6 | 25.5 |
| 45-64 | 11.4 | 11.5 | 11.4 | 11.3 | 11.2 | 11.8 |
| 65 and over | 2.7 | 2.9 | 3.2 | 3.4 | 3.5 | 3.9 |
| 19. Middle American mainland^a | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 18.7 | 18.1 | 18.1 | 18.0 | 17.9 | 14.8 |
| 5-14 | 26.8 | 27.9 | 27.8 | 27.4 | 27.4 | 25.7 |
| 15-24 | 18.2 | 18.4 | 18.9 | 19.6 | 19.5 | 20.4 |
| 25-44 | 22.3 | 22.1 | 21.8 | 21.6 | 21.9 | 24.8 |
| 45-64 | 10.6 | 10.3 | 10.2 | 10.2 | 10.1 | 10.8 |
| 65 and over | 3.4 | 3.2 | 3.2 | 3.2 | 3.2 | 3.5 |
| 20. Temperate South America^a | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 11.8 | 11.8 | 11.5 | 11.1 | 10.8 | 9.9 |
| 5-14 | 20.7 | 20.5 | 20.4 | 20.3 | 19.9 | 18.0 |
| 15-24 | 17.1 | 17.0 | 17.2 | 17.2 | 17.3 | 16.8 |
| 25-44 | 28.4 | 27.6 | 27.0 | 26.4 | 26.3 | 27.9 |
| 45-64 | 17.1 | 17.6 | 17.7 | 18.1 | 18.3 | 18.5 |
| 65 and over | 4.9 | 5.5 | 6.2 | 6.9 | 7.4 | 8.9 |
| 21. Caribbean^a | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 15.4 | 15.6 | 15.7 | 15.5 | 15.2 | 12.7 |
| 5-14 | 24.5 | 24.5 | 24.6 | 24.8 | 24.9 | 22.9 |
| 15-24 | 18.8 | 18.8 | 18.7 | 18.6 | 18.7 | 19.4 |
| 25-44 | 24.7 | 24.6 | 24.5 | 24.5 | 24.5 | 26.5 |
| 45-64 | 12.7 | 12.6 | 12.6 | 12.6 | 12.7 | 13.8 |
| 65 and over | 3.9 | 3.9 | 3.9 | 4.0 | 4.0 | 4.7 |
| H. OCEANIA, TOTAL^a | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 11.5 | 11.1 | 10.9 | 11.1 | 11.6 | 11.5 |
| 5-14 | 20.2 | 20.1 | 19.9 | 19.3 | 19.2 | 20.1 |
| 15-24 | 14.7 | 16.5 | 17.4 | 17.4 | 16.8 | 17.1 |
| 25-44 | 26.9 | 25.7 | 24.9 | 25.5 | 26.1 | 25.4 |
| 45-64 | 18.9 | 18.9 | 19.2 | 18.9 | 18.0 | 17.4 |
| 65 and over | 7.8 | 7.7 | 7.7 | 7.8 | 8.3 | 8.5 |
| 22. Australia and New Zealand | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 10.9 | 10.4 | 10.1 | 10.3 | 10.8 | 10.5 |
| 5-14 | 19.7 | 19.6 | 19.3 | 18.6 | 18.3 | 19.1 |
| 15-24 | 14.0 | 16.1 | 17.3 | 17.2 | 16.7 | 16.8 |
| 25-44 | 27.0 | 25.7 | 24.8 | 25.5 | 26.3 | 25.8 |
| 45-64 | 19.9 | 19.8 | 20.1 | 19.9 | 18.8 | 18.4 |
| 65 and over | 8.5 | 8.4 | 8.4 | 8.5 | 9.1 | 9.4 |

TABLE A2.1 (continued)

| Area and age (years) | 1960 | 1965 | 1970 | 1975 | 1980 | 2000 |
|----------------------------|-------|-------|-------|-------|-------|-------|
| 23. Melanesia ¹ | | | | | | |
| All ages | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 0-4 | 14.7 | 15.0 | 15.3 | 15.7 | 15.9 | 16.4 |
| 5-14 | 23.4 | 23.4 | 23.5 | 23.9 | 24.3 | 25.2 |
| 15-24 | 19.0 | 18.8 | 18.6 | 18.3 | 18.2 | 18.8 |
| 25-44 | 26.0 | 25.9 | 25.7 | 25.3 | 24.8 | 23.6 |
| 45-64 | 13.4 | 13.4 | 13.3 | 13.2 | 13.1 | 12.2 |
| 65 and over | 3.5 | 3.5 | 3.6 | 3.6 | 3.7 | 3.8 |

¹Excluding data for Israel, Cyprus, Polynesia and Micronesia.

²Calculated on the basis of data for mainland China only.

³Calculated on the basis of official age data for the Republic of Korea and China (Taiwan).

⁴Excluding data for Israel and Cyprus.

⁵Calculated on the basis of projections for India and Pakistan.

⁶The age data for 1960, or a date close to 1960, for countries of the region were added together so far as available, to represent the approximate age composition of the region's combined population.

⁷Calculated on the basis of official age data for Turkey, combined with population models adopted for Northern Arab and Southern Arab countries. The majority of the region's population is thus represented, but not Israel and Cyprus.

⁸Calculated on the basis of available official projections for all but a few small countries of Europe.

⁹To obtain an estimate of age composition in 1960, a projection was carried out from census age data for 1959 and interpolated for mid-year 1960. Adjustments were made for certain five-year groups, in accordance with birth rates recorded in previous years or estimated.

¹⁰The age data were derived from population models corresponding to the estimated levels of fertility and mortality.

¹¹Calculated on the basis of official age data for the United Arab Republic, Morocco and Tunisia.

¹²Calculated on the basis of sample age data of the 1960 census for South Africa.

¹³Official data for the United States and Canada were combined.

¹⁴Sum of age compositions used for each region.

¹⁵Calculated on the basis of data for Brazil.

¹⁶Calculated on the basis of data for Mexico.

¹⁷Sum of age data used in the projections for Argentina, Chile, Paraguay and Uruguay.

¹⁸The age data were derived from population model corresponding to the estimated average levels of fertility and mortality in the region in 1960.

¹⁹Excluding data for Polynesia and Micronesia.

²⁰The age composition was assumed to be the same as in Middle Africa.

Annex III
TABLES OF POPULATION ESTIMATES AND PROJECTIONS

TABLE A3.1
Population estimates, 1920-1960, for major areas and regions of the world

(Population in thousands)

| Major areas and regions | 1920 | 1930 | 1940 | 1950 | 1960 |
|---|-----------|-----------|-----------|-----------|-----------|
| WORLD TOTAL | 1,859,892 | 2,068,629 | 2,295,033 | 2,515,425 | 2,998,180 |
| More developed regions ^a | 672,619 | 757,856 | 820,696 | 857,673 | 976,414 |
| Less developed regions ^b | 1,187,273 | 1,310,773 | 1,474,337 | 1,657,752 | 2,021,766 |
| A. East Asia | 553,345 | 591,244 | 634,420 | 684,353 | 794,144 |
| 1. Mainland region | 476,382 | 501,742 | 532,911 | 563,228 | 654,181 |
| 2. Japan | 55,391 | 63,872 | 71,400 | 82,900 | 93,210 |
| 3. Other East Asia | 21,572 | 25,630 | 30,109 | 38,225 | 46,753 |
| B. South Asia | 469,770 | 528,964 | 609,993 | 696,722 | 865,247 |
| 4. Middle South Asia | 333,100 | 370,876 | 422,173 | 479,039 | 587,277 |
| 5. South-East Asia | 107,971 | 126,711 | 150,366 | 172,514 | 218,866 |
| 6. South-West Asia | 28,699 | 31,377 | 37,454 | 45,169 | 59,104 |
| C. Europe | 324,800 | 353,947 | 378,920 | 391,717 | 424,657 |
| 7. Western Europe | 101,351 | 108,583 | 113,246 | 122,437 | 134,536 |
| 8. Southern Europe | 82,776 | 92,624 | 102,516 | 108,364 | 117,488 |
| 9. Eastern Europe | 78,702 | 87,745 | 94,855 | 88,439 | 96,852 |
| 10. Northern Europe | 61,971 | 64,995 | 68,303 | 72,477 | 75,781 |
| D. 11. USSR | 155,300 | 179,000 | 195,000 | 180,000 | 214,400 |
| E. Africa | 142,921 | 163,846 | 191,458 | 221,538 | 272,924 |
| 12. Western Africa | 40,000 | 48,000 | 58,000 | 67,500 | 85,973 |
| 13. Eastern Africa | 40,000 | 46,000 | 54,000 | 62,500 | 75,032 |
| 14. Middle Africa | 20,000 | 21,000 | 23,000 | 25,000 | 28,345 |
| 15. Northern Africa | 35,075 | 39,119 | 44,773 | 52,594 | 65,955 |
| 16. Southern Africa | 7,846 | 9,727 | 11,685 | 13,944 | 17,619 |
| F. 17. Northern America | 115,661 | 134,166 | 144,342 | 166,073 | 198,664 |
| G. Latin America | 89,574 | 107,418 | 129,840 | 162,345 | 212,431 |
| 18. Tropical South America | 45,639 | 54,494 | 66,767 | 84,102 | 112,479 |
| 19. Middle America (Mainland) | 19,443 | 22,456 | 26,863 | 34,694 | 46,811 |
| 20. Temperate South America | 14,826 | 18,877 | 22,319 | 26,856 | 32,796 |
| 21. Caribbean | 9,666 | 11,591 | 13,891 | 16,693 | 20,345 |
| H. Oceania | 8,521 | 10,044 | 11,060 | 12,677 | 15,713 |
| 22. Australia and New Zealand | 6,641 | 7,994 | 8,715 | 10,127 | 12,687 |
| 23. Melanesia | 1,500 | 1,600 | 1,750 | 1,900 | 2,166 |
| 24. Polynesia and Micronesia | 380 | 450 | 595 | 650 | 860 |

^aIncluding Europe, the USSR, Northern America, Japan, Temperate South America, Australia and New Zealand.

^bIncluding East Asia less Japan, South Asia, Africa, Latin America less Temperate South America and Oceania less Australia and New Zealand.

TABLE A3.2
Population estimates according to the "medium" variant, 1960-2000, for major areas and regions of the world

(Population in thousands)

| Major areas and regions | 1960 | 1965 | 1970 | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| WORLD TOTAL | 2,998,180 | 3,280,522 | 3,591,773 | 3,944,137 | 4,330,037 | 4,746,409 | 5,187,929 | 5,647,923 | 6,129,734 |
| More developed regions ^a | 976,414 | 1,031,759 | 1,082,150 | 1,135,587 | 1,193,854 | 1,256,179 | 1,318,433 | 1,379,812 | 1,441,402 |
| Less developed regions ^b | 2,021,766 | 2,248,763 | 2,509,623 | 2,808,550 | 3,136,183 | 3,490,230 | 3,869,496 | 4,268,111 | 4,688,332 |
| A. East Asia | 794,144 | 851,520 | 910,524 | 975,935 | 1,041,097 | 1,104,903 | 1,167,882 | 1,228,006 | 1,287,270 |
| 1. Mainland region | 654,181 | 700,000 | 748,000 | 799,000 | 850,000 | 900,000 | 950,000 | 998,000 | 1,045,000 |
| 2. Japan | 93,210 | 97,523 | 101,465 | 106,174 | 111,064 | 115,169 | 118,280 | 120,561 | 122,400 |
| 3. Other East Asia | 46,753 | 53,997 | 61,059 | 70,761 | 80,033 | 89,734 | 99,602 | 109,445 | 119,870 |
| B. South Asia | 865,247 | 976,341 | 1,106,905 | 1,256,352 | 1,420,258 | 1,596,329 | 1,782,525 | 1,973,889 | 2,170,648 |
| 4. Middle South Asia | 587,277 | 659,977 | 746,892 | 846,932 | 953,709 | 1,064,374 | 1,177,133 | 1,288,246 | 1,398,810 |
| 5. South-East Asia | 218,866 | 249,213 | 283,035 | 320,720 | 364,310 | 414,686 | 471,973 | 535,170 | 603,272 |
| 6. South-West Asia | 59,104 | 67,151 | 76,978 | 88,700 | 102,239 | 117,269 | 133,419 | 150,473 | 168,566 |
| C. Europe | 424,657 | 440,303 | 453,918 | 466,772 | 479,391 | 491,891 | 503,858 | 515,674 | 526,968 |
| 7. Western Europe | 134,536 | 139,456 | 143,766 | 147,876 | 151,845 | 155,724 | 159,769 | 163,635 | 167,699 |
| 8. Southern Europe | 117,488 | 121,831 | 125,671 | 129,205 | 132,569 | 136,342 | 139,238 | 142,539 | 145,360 |
| 9. Eastern Europe | 96,852 | 101,414 | 105,354 | 109,341 | 113,597 | 117,414 | 121,601 | 125,181 | 128,426 |
| 10. Northern Europe | 75,781 | 77,602 | 79,127 | 80,350 | 81,380 | 82,411 | 83,250 | 84,319 | 85,483 |
| D. 11. USSR | 214,400 | 231,000 | 245,700 | 260,800 | 277,800 | 296,804 | 316,090 | 334,845 | 353,085 |
| E. Africa | 272,924 | 306,173 | 345,949 | 393,257 | 448,869 | 513,026 | 586,702 | 671,207 | 767,779 |
| 12. Western Africa | 85,973 | 98,359 | 112,862 | 129,851 | 149,818 | 173,369 | 201,832 | 236,082 | 277,192 |
| 13. Eastern Africa | 75,032 | 81,957 | 90,397 | 100,505 | 112,515 | 126,518 | 142,528 | 161,153 | 183,119 |
| 14. Middle Africa | 28,345 | 30,553 | 33,299 | 36,632 | 40,592 | 45,225 | 50,610 | 56,965 | 64,519 |
| 15. Northern Africa | 65,955 | 75,351 | 86,712 | 100,408 | 116,369 | 133,920 | 152,577 | 172,185 | 192,148 |
| 16. Southern Africa | 17,619 | 19,953 | 22,679 | 25,861 | 29,575 | 33,994 | 39,155 | 44,822 | 50,801 |
| F. 17. Northern America | 198,664 | 213,150 | 226,803 | 242,942 | 261,629 | 283,105 | 305,926 | 329,186 | 354,007 |
| G. Latin America | 212,431 | 244,880 | 283,263 | 327,584 | 378,437 | 435,558 | 497,920 | 565,681 | 638,111 |
| 18. Tropical South America | 112,479 | 131,334 | 153,838 | 179,798 | 209,506 | 242,902 | 279,613 | 319,463 | 361,985 |
| 19. Middle America (mainland) | 46,811 | 54,844 | 64,595 | 76,359 | 90,433 | 106,662 | 124,655 | 144,469 | 165,901 |
| 20. Temperate South America | 32,796 | 35,966 | 39,302 | 42,708 | 46,221 | 49,778 | 53,227 | 56,771 | 60,514 |
| 21. Caribbean | 20,345 | 22,736 | 25,528 | 28,719 | 32,277 | 36,216 | 40,425 | 44,978 | 49,711 |
| H. Oceania | 15,713 | 17,155 | 18,711 | 20,495 | 22,556 | 24,793 | 27,026 | 29,435 | 31,866 |
| 22. Australia and New Zealand | 12,687 | 13,817 | 14,962 | 16,191 | 17,749 | 19,432 | 21,052 | 22,775 | 24,428 |
| 23. Melanesia | 2,166 | 2,338 | 2,549 | 2,804 | 3,107 | 3,461 | 3,874 | 4,360 | 4,938 |
| 24. Polynesia and Micronesia | 860 | 1,000 | 1,200 | 1,500 | 1,700 | 1,900 | 2,100 | 2,300 | 2,500 |

^aIncluding Europe, the USSR, Northern America, Japan, Temperate South America, Australia and New Zealand.

^bIncluding East Asia less Japan, South Asia, Africa, Latin America less Temperate South America and Oceania less Australia and New Zealand.

TABLE A3.3
Population estimates according to the "high" variant, 1960-2000, for major areas and regions of the world

(Population in thousands)

| Major areas and regions | 1960 | 1965 | 1970 | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| WORLD TOTAL | 2,998,180 | 3,305,862 | 3,659,157 | 4,070,083 | 4,550,733 | 5,096,198 | 5,689,910 | 6,325,593 | 6,993,986 |
| More developed regions ^a | 976,414 | 1,038,410 | 1,102,074 | 1,170,451 | 1,244,728 | 1,321,537 | 1,402,019 | 1,485,660 | 1,574,079 |
| Less developed regions ^b | 2,021,766 | 2,267,452 | 2,557,083 | 2,899,632 | 3,306,005 | 3,774,661 | 4,287,891 | 4,839,933 | 5,419,907 |
| A. East Asia | 794,144 | 869,950 | 956,283 | 1,056,589 | 1,170,951 | 1,289,018 | 1,405,321 | 1,515,953 | 1,623,170 |
| 1. Mainland region | 654,181 | 718,000 | 791,000 | 875,000 | 971,000 | 1,070,000 | 1,167,000 | 1,258,000 | 1,345,000 |
| 2. Japan | 93,210 | 97,865 | 102,972 | 109,536 | 116,554 | 122,819 | 128,216 | 133,311 | 138,731 |
| 3. Other East Asia | 46,753 | 54,085 | 62,311 | 72,053 | 83,397 | 96,199 | 110,105 | 124,642 | 139,439 |
| B. South Asia | 865,247 | 976,550 | 1,107,569 | 1,262,512 | 1,447,692 | 1,665,607 | 1,909,998 | 2,174,390 | 2,443,531 |
| 4. Middle South Asia | 587,277 | 659,977 | 746,892 | 850,684 | 974,841 | 1,120,290 | 1,280,930 | 1,450,581 | 1,614,152 |
| 5. South-East Asia | 218,866 | 249,422 | 283,699 | 322,951 | 369,613 | 425,211 | 489,796 | 563,154 | 645,358 |
| 6. South-West Asia | 59,104 | 67,151 | 76,978 | 88,877 | 103,238 | 120,106 | 139,272 | 160,655 | 184,021 |
| C. Europe | 424,657 | 441,268 | 457,850 | 474,801 | 491,701 | 508,703 | 526,139 | 544,349 | 563,159 |
| 7. Western Europe | 134,536 | 139,752 | 144,962 | 150,299 | 155,539 | 160,800 | 166,407 | 172,168 | 178,478 |
| 8. Southern Europe | 117,488 | 122,119 | 126,839 | 131,573 | 136,180 | 141,481 | 145,770 | 150,962 | 155,968 |
| 9. Eastern Europe | 96,852 | 101,636 | 106,270 | 111,236 | 116,542 | 121,175 | 126,983 | 132,100 | 137,151 |
| 10. Northern Europe | 75,781 | 77,761 | 79,779 | 81,693 | 83,440 | 85,247 | 86,979 | 89,119 | 91,562 |
| D. 11. USSR | 214,400 | 233,853 | 253,827 | 274,157 | 296,032 | 319,891 | 346,010 | 373,775 | 402,772 |
| E. Africa | 272,924 | 306,563 | 348,468 | 399,989 | 462,886 | 538,972 | 629,061 | 736,266 | 864,282 |
| 12. Western Africa | 85,973 | 98,535 | 114,007 | 132,973 | 156,165 | 184,631 | 219,799 | 263,572 | 317,915 |
| 13. Eastern Africa | 75,032 | 82,120 | 91,342 | 102,955 | 117,330 | 134,780 | 155,244 | 179,841 | 209,946 |
| 14. Middle Africa | 28,345 | 30,559 | 33,548 | 37,361 | 42,104 | 47,971 | 54,917 | 63,402 | 73,792 |
| 15. Northern Africa | 65,955 | 75,351 | 86,712 | 100,408 | 116,884 | 136,236 | 157,732 | 180,749 | 204,982 |
| 16. Southern Africa | 17,619 | 19,998 | 22,859 | 26,292 | 30,403 | 35,354 | 41,369 | 48,702 | 57,647 |
| F. 17. Northern America | 198,664 | 215,513 | 232,746 | 252,113 | 274,818 | 298,182 | 323,083 | 348,542 | 376,141 |
| G. Latin America | 212,431 | 244,935 | 283,436 | 328,902 | 383,243 | 449,815 | 521,603 | 600,624 | 686,084 |
| 18. Tropical South America | 112,479 | 131,334 | 153,842 | 180,327 | 211,871 | 251,892 | 294,611 | 343,866 | 386,113 |
| 19. Middle America (mainland) | 46,811 | 54,845 | 64,597 | 76,595 | 91,522 | 109,223 | 128,856 | 149,725 | 171,574 |
| 20. Temperate South America | 32,796 | 36,020 | 39,469 | 43,184 | 47,236 | 51,704 | 56,479 | 61,542 | 67,077 |
| 21. Caribbean | 20,345 | 22,736 | 25,528 | 28,796 | 32,614 | 36,996 | 41,657 | 46,491 | 51,320 |
| H. Oceania | 15,713 | 17,230 | 18,978 | 21,020 | 23,410 | 26,010 | 28,695 | 31,694 | 34,847 |
| 22. Australia and New Zealand | 12,697 | 13,891 | 15,210 | 16,660 | 18,387 | 20,238 | 22,092 | 24,141 | 26,199 |
| 23. Melanesia | 2,166 | 2,339 | 2,568 | 2,860 | 3,223 | 3,672 | 4,203 | 4,853 | 5,648 |
| 24. Polynesia and Micronesia | 860 | 1,000 | 1,200 | 1,500 | 1,800 | 2,100 | 2,400 | 2,700 | 3,000 |

^aIncluding Europe, the USSR, Northern America, Japan, Temperate South America, Australia and New Zealand.

^bIncluding East Asia less Japan, South Asia, Africa, Latin America less Temperate South America and Oceania less Australia and New Zealand.

TABLE A3.4

Population estimates according to the "low" variant, 1960-2000, for major areas and regions of the world

(Population in thousands)

| Major areas and regions | 1960 | 1965 | 1970 | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| WORLD TOTAL | 2,998,180 | 3,265,555 | 3,544,781 | 3,840,439 | 4,147,337 | 4,462,720 | 4,782,859 | 5,109,362 | 5,448,533 |
| More developed regions ^a | 976,414 | 1,028,862 | 1,069,745 | 1,110,340 | 1,153,323 | 1,195,026 | 1,234,313 | 1,266,219 | 1,293,175 |
| Less developed regions ^b | 2,021,766 | 2,236,693 | 2,475,036 | 2,730,099 | 2,994,014 | 3,267,694 | 3,549,546 | 3,843,143 | 4,155,358 |
| A. East Asia | 794,144 | 839,970 | 883,366 | 926,689 | 966,092 | 1,002,895 | 1,039,118 | 1,079,058 | 1,118,122 |
| 1. Mainland region | 654,181 | 689,000 | 722,000 | 754,000 | 782,000 | 808,000 | 834,000 | 864,000 | 893,000 |
| 2. Japan | 93,210 | 97,159 | 100,328 | 104,081 | 107,762 | 110,750 | 112,950 | 114,378 | 115,326 |
| 3. Other East Asia | 46,753 | 53,811 | 61,038 | 68,608 | 76,330 | 84,145 | 92,168 | 100,680 | 109,796 |
| B. South Asia | 865,247 | 975,777 | 1,101,743 | 1,237,117 | 1,378,496 | 1,526,188 | 1,675,465 | 1,825,655 | 1,984,435 |
| 4. Middle South Asia | 587,277 | 659,977 | 743,752 | 832,611 | 922,138 | 1,012,824 | 1,101,103 | 1,188,439 | 1,283,065 |
| 5. South-East Asia | 218,866 | 248,792 | 281,465 | 317,082 | 356,997 | 401,363 | 449,372 | 499,081 | 549,594 |
| 6. South-West Asia | 59,104 | 67,008 | 76,526 | 87,424 | 99,361 | 112,001 | 124,990 | 138,135 | 151,776 |
| C. Europe | 424,657 | 439,340 | 449,988 | 458,742 | 467,081 | 475,079 | 481,578 | 486,999 | 490,777 |
| 7. Western Europe | 134,536 | 139,160 | 142,570 | 145,452 | 148,151 | 150,648 | 153,132 | 155,101 | 156,920 |
| 8. Southern Europe | 117,488 | 121,543 | 124,503 | 126,838 | 128,958 | 131,203 | 132,707 | 134,115 | 134,753 |
| 9. Eastern Europe | 96,852 | 101,193 | 104,439 | 107,446 | 110,651 | 113,653 | 116,219 | 118,263 | 119,700 |
| 10. Northern Europe | 75,781 | 77,444 | 78,476 | 79,006 | 79,321 | 79,575 | 79,520 | 79,520 | 79,404 |
| D. 11. USSR | 214,400 | 230,627 | 243,486 | 255,768 | 268,865 | 282,387 | 296,533 | 307,306 | 316,464 |
| E. Africa | 272,924 | 305,859 | 343,633 | 386,653 | 434,486 | 486,730 | 545,614 | 611,088 | 684,132 |
| 12. Western Africa | 85,973 | 98,269 | 112,093 | 127,711 | 145,401 | 165,336 | 189,339 | 217,461 | 250,284 |
| 13. Eastern Africa | 75,032 | 81,884 | 89,773 | 98,847 | 109,155 | 120,572 | 133,531 | 148,217 | 164,976 |
| 14. Middle Africa | 28,345 | 30,471 | 32,969 | 35,816 | 39,080 | 42,755 | 46,990 | 51,835 | 57,395 |
| 15. Northern Africa | 65,955 | 75,282 | 86,119 | 98,418 | 111,400 | 124,770 | 138,452 | 152,152 | 165,899 |
| 16. Southern Africa | 17,619 | 19,953 | 22,679 | 25,861 | 29,450 | 33,297 | 37,302 | 41,423 | 45,578 |
| F. 17. Northern America | 198,664 | 212,028 | 222,156 | 234,102 | 248,250 | 261,592 | 274,207 | 284,736 | 294,337 |
| G. Latin America ^c | 212,431 | 244,828 | 281,805 | 321,313 | 362,278 | 404,483 | 446,466 | 488,133 | 532,388 |
| 18. Tropical South America | 112,479 | 131,334 | 153,168 | 176,533 | 200,745 | 225,453 | 249,924 | 274,147 | 299,977 |
| 19. Middle America (mainland) | 46,811 | 54,844 | 64,304 | 74,908 | 86,443 | 98,525 | 110,699 | 122,976 | 136,241 |
| 20. Temperate South America ^d | 32,796 | 35,914 | 38,906 | 41,633 | 44,067 | 46,724 | 49,463 | 52,080 | 54,586 |
| 21. Caribbean | 20,345 | 22,736 | 25,427 | 28,239 | 31,023 | 33,781 | 36,380 | 38,930 | 41,584 |
| H. Oceania | 15,713 | 17,126 | 18,604 | 20,055 | 21,789 | 23,366 | 24,878 | 26,387 | 27,878 |
| 22. Australia and New Zealand | 12,687 | 13,794 | 14,881 | 16,014 | 17,298 | 18,494 | 19,582 | 20,720 | 21,685 |
| 23. Melanesia | 2,166 | 2,332 | 2,523 | 2,741 | 2,991 | 3,272 | 3,596 | 3,967 | 4,393 |
| 24. Polynesia and Micronesia | 860 | 1,000 | 1,200 | 1,300 | 1,500 | 1,600 | 1,700 | 1,700 | 1,800 |

^aIncluding Europe, the USSR, Northern America, Japan, Temperate South America, Australia and New Zealand.^bIncluding East Asia less Japan, South Asia, Africa, Latin America less Temperate South America and Oceania less Australia and New Zealand.

TABLE A3.5

Population estimates according to "constant fertility, no migration", 1960-2000, in major areas and regions of the world

(Population in thousands)

| Major areas and regions | 1960 | 1965 | 1970 | 1975 | 1980 | 1985 | 1990 | 1995 | 2000 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| WORLD TOTAL | 2,998,180 | 3,297,482 | 3,640,970 | 4,042,761 | 4,519,146 | 5,088,112 | 5,763,577 | 6,564,584 | 7,522,218 |
| More developed regions ^a | 976,414 | 1,037,209 | 1,100,340 | 1,168,202 | 1,241,660 | 1,319,857 | 1,401,980 | 1,488,187 | 1,580,049 |
| Less developed regions ^b | 2,021,766 | 2,260,273 | 2,540,630 | 2,874,559 | 3,277,486 | 3,768,255 | 4,361,597 | 5,076,397 | 5,942,169 |
| A. East Asia | 794,144 | 863,258 | 942,256 | 1,034,364 | 1,142,609 | 1,272,236 | 1,424,527 | 1,601,016 | 1,810,678 |
| 1. Mainland region | 654,181 | 711,000 | 776,000 | 852,000 | 942,000 | 1,051,000 | 1,180,000 | 1,330,000 | 1,509,000 |
| 2. Japan | 93,210 | 98,011 | 103,341 | 108,861 | 114,055 | 118,457 | 121,948 | 124,809 | 127,160 |
| 3. Other East Asia | 46,753 | 54,247 | 62,915 | 73,503 | 86,554 | 102,779 | 122,579 | 146,207 | 174,518 |
| B. South Asia | 865,247 | 975,940 | 1,105,563 | 1,259,456 | 1,446,153 | 1,674,235 | 1,952,050 | 2,290,246 | 2,701,865 |
| 4. Middle South Asia | 587,277 | 660,148 | 746,062 | 848,430 | 972,506 | 1,123,880 | 1,308,534 | 1,534,394 | 1,811,220 |
| 5. South-East Asia | 218,866 | 248,641 | 282,523 | 322,149 | 370,409 | 430,006 | 502,966 | 590,983 | 696,620 |
| 6. South-West Asia | 59,104 | 67,151 | 76,978 | 88,877 | 103,238 | 120,349 | 140,550 | 164,869 | 194,025 |
| C. Europe | 424,657 | 442,416 | 460,136 | 478,209 | 496,448 | 514,820 | 533,108 | 551,655 | 570,785 |
| 7. Western Europe | 134,536 | 139,157 | 143,583 | 148,036 | 152,284 | 156,621 | 161,183 | 166,123 | 171,520 |
| 8. Southern Europe | 117,488 | 123,273 | 129,224 | 135,221 | 141,304 | 147,498 | 153,492 | 159,291 | 164,962 |
| 9. Eastern Europe | 96,852 | 101,654 | 106,234 | 111,105 | 116,313 | 121,475 | 126,498 | 131,411 | 136,213 |
| 10. Northern Europe | 75,781 | 78,332 | 81,095 | 83,847 | 86,547 | 89,226 | 91,935 | 94,830 | 98,090 |
| D. 11. USSR | 214,400 | 233,411 | 252,498 | 272,415 | 294,594 | 318,896 | 345,084 | 372,800 | 402,077 |
| E. Africa | 272,924 | 306,563 | 347,791 | 397,830 | 458,251 | 531,213 | 619,748 | 728,013 | 860,462 |
| 12. Western Africa | 85,973 | 98,535 | 114,007 | 132,973 | 156,165 | 184,631 | 219,799 | 263,572 | 317,915 |
| 13. Eastern Africa | 75,032 | 82,120 | 90,910 | 101,579 | 114,355 | 129,384 | 146,976 | 167,803 | 192,725 |
| 14. Middle Africa | 28,345 | 30,559 | 33,303 | 36,578 | 40,444 | 45,001 | 50,389 | 56,832 | 64,427 |
| 15. Northern Africa | 65,955 | 75,351 | 86,712 | 100,408 | 116,884 | 136,843 | 161,215 | 191,104 | 227,748 |
| 16. Southern Africa | 17,619 | 19,998 | 22,859 | 26,292 | 30,403 | 35,354 | 41,369 | 48,702 | 57,647 |
| F. 17. Northern America | 198,664 | 213,840 | 230,409 | 249,840 | 272,238 | 297,348 | 324,955 | 354,914 | 388,264 |
| G. Latin America | 212,431 | 245,080 | 283,899 | 330,488 | 386,856 | 455,131 | 537,450 | 636,447 | 755,579 |
| 18. Tropical South America | 112,479 | 131,334 | 153,838 | 180,933 | 213,792 | 253,728 | 302,118 | 360,626 | 431,302 |
| 19. Middle America (mainland) | 46,811 | 54,926 | 64,775 | 76,878 | 91,921 | 110,535 | 133,312 | 161,037 | 194,816 |
| 20. Temperate South America | 32,796 | 35,896 | 39,287 | 43,018 | 47,123 | 51,647 | 56,587 | 61,966 | 67,786 |
| 21. Caribbean | 20,345 | 22,924 | 25,999 | 29,659 | 34,020 | 39,221 | 45,433 | 52,818 | 61,675 |
| H. Oceania | 15,713 | 16,974 | 18,418 | 20,159 | 21,997 | 24,233 | 26,655 | 29,493 | 32,508 |
| 22. Australia and New Zealand | 12,687 | 13,635 | 14,669 | 15,859 | 17,202 | 18,689 | 20,298 | 22,043 | 23,977 |
| 23. Melanesia | 2,166 | 2,339 | 2,549 | 2,800 | 3,095 | 3,444 | 3,857 | 4,350 | 4,931 |
| 24. Polynesia and Micronesia | 860 | 1,000 | 1,200 | 1,500 | 1,700 | 2,100 | 2,500 | 3,100 | 3,600 |

^aIncluding Europe, the USSR, Northern America, Japan, Temperate South America, Australia and New Zealand.^bIncluding East Asia less Japan, South Asia, Africa, Latin America less Temperate South America and Oceania less Australia and New Zealand.

TABLE A3.6

Decennial rates of increase of population, 1920-1960 and 1960-2000 according to "medium" estimates, for major areas and regions of the world

(Per cent increase of population during ten-year periods)

| Major areas and regions | 1920-1930 | 1930-1940 | 1940-1950 | 1950-1960 | 1960-1970 | 1970-1980 | 1980-1990 | 1990-2000 |
|---|-----------|-----------|-----------|-----------|---------------------|---------------------|---------------------|---------------------|
| A. EAST ASIA | 6.8 | 7.3 | 7.9 | 16.0 | 14.7 | 14.3 | 12.2 | 10.2 |
| 1. Mainland region | 5.3 | 6.2 | 5.7 | 16.1 | 14.3 | 13.6 | 11.8 | 10.0 |
| 2. Japan | 15.3 | 11.8 | 16.1 | 12.4 | 8.9 | 9.5 | 6.5 | 3.5 |
| 3. Other East Asia | 18.8 | 17.5 | 27.0 | 22.3 | 30.6 | 31.1 | 24.5 | 20.3 |
| B. SOUTH ASIA | 12.6 | 15.3 | 14.2 | 24.2 | 27.9 | 28.3 | 24.5 | 21.8 |
| 4. Middle South Asia | 11.3 | 13.8 | 13.5 | 22.6 | 27.2 | 27.7 | 23.4 | 18.8 |
| 5. South-East Asia | 17.4 | 18.7 | 14.7 | 26.9 | 29.3 | 28.7 | 29.6 | 27.8 |
| 6. South-West Asia | 9.3 | 19.4 | 20.6 | 30.9 | 30.2 | 32.8 | 30.5 | 26.3 |
| C. EUROPE | 9.0 | 7.1 | 3.4 | 8.4 | 6.9 | 5.6 | 5.1 | 4.6 |
| 7. Western Europe | 7.1 | 4.3 | 8.1 | 9.9 | 6.9 | 5.6 | 5.2 | 5.0 |
| 8. Southern Europe | 11.9 | 10.7 | 5.7 | 8.4 | 7.0 | 5.5 | 5.0 | 4.4 |
| 9. Eastern Europe | 11.5 | 8.1 | -6.8 | 9.5 | 8.8 | 7.8 | 7.0 | 5.6 |
| 10. Northern Europe | 4.9 | 5.1 | 6.1 | 4.6 | 4.4 | 2.8 | 2.3 | 2.7 |
| D. 11. USSR | 15.3 | 8.9 | -7.7 | 19.1 | 14.6 | 13.1 | 13.8 | 11.7 |
| E. AFRICA | 14.6 | 16.9 | 15.7 | 23.2 | 26.8 | 29.8 | 30.7 | 30.9 |
| 12. Western Africa | 20.0 | 20.8 | 16.4 | 27.4 | 31.3 | 32.7 | 34.7 | 37.3 |
| 13. Eastern Africa | 15.0 | 17.4 | 15.7 | 20.1 | 20.5 | 24.5 | 26.7 | 28.5 |
| 14. Middle Africa | 5.0 | 9.5 | 8.7 | 13.4 | 17.5 | 21.9 | 24.7 | 27.5 |
| 15. Northern Africa | 11.5 | 14.5 | 17.5 | 25.4 | 31.5 | 34.2 | 31.1 | 25.9 |
| 16. Southern Africa | 24.0 | 20.1 | 19.3 | 26.4 | 28.7 | 30.4 | 32.4 | 29.7 |
| F. 17. NORTHERN AMERICA | 16.0 | 7.6 | 15.1 | 19.6 | 14.2 | 15.4 | 16.9 | 15.7 |
| G. LATIN AMERICA | 19.9 | 20.9 | 25.0 | 30.9 | 33.3 | 33.6 | 31.6 | 28.2 |
| 18. Tropical South America | 19.4 | 22.5 | 26.0 | 33.7 | 36.8 | 36.2 | 33.5 | 29.5 |
| 19. Middle America (mainland) | 15.5 | 19.6 | 29.2 | 34.9 | 38.0 | 40.0 | 37.8 | 33.1 |
| 20. Temperate South America | 27.3 | 18.2 | 20.3 | 22.1 | 19.8 | 17.6 | 15.2 | 13.7 |
| 21. Caribbean | 19.9 | 19.8 | 20.2 | 21.9 | 25.5 | 26.4 | 25.2 | 23.0 |
| H. OCEANIA | 17.9 | 10.1 | 14.6 | 23.1 | 19.1 | 20.5 | 19.8 | 17.9 |
| 22. Australia and New Zealand | 20.4 | 9.0 | 16.2 | 25.3 | 17.9 | 18.6 | 18.6 | 16.0 |
| 23. Melanesia | 6.7 | 9.4 | 8.6 | 14.0 | 17.7 | 21.9 | 24.7 | 27.5 |
| 24. Polynesia and Micronesia | 18.4 | 32.0 | 9.2 | 32.3 | (40.0) ^a | (35.0) ^a | (25.0) ^a | (15.0) ^a |

^aArbitrarily assumed.

TABLE A3.7

Decennial rates of increase of population 1960-2000 according to "high", "low" and "constant fertility, no migration" estimates, for major areas and regions of the world

Per cent increase of population during ten-year periods

| Major areas and regions | "High" variant | | | | "Low" variant | | | | "Constant fertility, no migration" variant | | | |
|---|----------------|-----------|-----------|-----------|---------------|-----------|-----------|-----------|--|-------------------|-------------------|-------------------|
| | 1960-1970 | 1970-1980 | 1980-1990 | 1990-2000 | 1960-1970 | 1970-1980 | 1980-1990 | 1990-2000 | 1960-1970 | 1970-1980 | 1980-1990 | 1990-2000 |
| A. EAST ASIA | 20.4 | 22.5 | 20.0 | 15.5 | 11.2 | 9.4 | 7.6 | 7.6 | 18.7 | 21.3 | 24.7 | 27.1 |
| 1. Mainland region | 20.9 | 22.8 | 20.2 | 15.3 | 10.4 | 8.3 | 6.6 | 7.1 | 18.6 | 21.4 | 25.3 | 27.9 |
| 2. Japan | 10.5 | 13.2 | 10.0 | 8.2 | 7.6 | 7.4 | 4.8 | 2.1 | 10.9 | 10.4 | 6.9 | 4.3 |
| 3. Other East Asia | 33.3 | 33.8 | 32.0 | 26.6 | 30.6 | 25.1 | 20.7 | 19.1 | 34.6 | 37.6 | 41.6 | 42.4 |
| B. SOUTH ASIA | 28.0 | 30.7 | 31.9 | 27.9 | 27.3 | 25.1 | 21.5 | 18.4 | 27.8 | 30.8 | 35.0 | 38.4 |
| 4. Middle South Asia | 27.2 | 30.5 | 31.4 | 26.0 | 26.6 | 24.0 | 19.4 | 16.5 | 27.0 | 30.4 | 34.6 | 38.4 |
| 5. South-East Asia | 29.6 | 30.3 | 32.5 | 31.8 | 28.6 | 26.8 | 25.9 | 22.3 | 29.1 | 31.1 | 35.8 | 38.5 |
| 6. South-West Asia | 30.2 | 34.1 | 34.9 | 32.1 | 29.5 | 29.8 | 25.8 | 21.4 | 30.2 | 34.1 | 36.1 | 38.0 |
| C. EUROPE | 7.8 | 7.4 | 7.0 | 7.0 | 6.0 | 3.8 | 3.1 | 1.9 | 8.4 | 7.9 | 7.4 | 7.1 |
| 7. Western Europe | 7.7 | 7.3 | 7.0 | 7.3 | 6.0 | 3.9 | 3.4 | 2.5 | 6.7 | 6.1 | 5.8 | 6.4 |
| 8. Southern Europe | 8.0 | 7.4 | 7.0 | 7.0 | 6.0 | 3.6 | 2.9 | 1.5 | 10.0 | 9.3 | 8.6 | 7.5 |
| 9. Eastern Europe | 9.7 | 9.7 | 9.0 | 8.0 | 7.8 | 5.9 | 5.0 | 3.0 | 9.7 | 9.5 | 8.8 | 7.7 |
| 10. Northern Europe | 5.3 | 4.6 | 4.2 | 5.3 | 3.6 | 1.1 | 0.3 | 0.2 | 7.0 | 6.7 | 6.3 | 6.7 |
| D. 11. USSR | 18.4 | 16.6 | 16.9 | 16.4 | 13.6 | 10.4 | 10.3 | 6.7 | 17.8 | 16.7 | 17.1 | 16.5 |
| E. AFRICA | 27.7 | 32.8 | 35.9 | 37.4 | 25.9 | 26.4 | 25.6 | 25.4 | 27.4 | 31.8 | 35.2 | 38.8 |
| 12. Western Africa | 32.6 | 37.0 | 40.7 | 44.6 | 30.4 | 29.7 | 30.2 | 32.2 | 32.6 | 37.0 | 40.7 | 44.6 |
| 13. Eastern Africa | 21.7 | 28.5 | 32.2 | 35.2 | 19.6 | 21.6 | 22.3 | 23.5 | 21.2 | 25.8 | 28.5 | 31.1 |
| 14. Middle Africa | 18.4 | 25.5 | 30.4 | 34.4 | 16.3 | 18.5 | 20.2 | 22.1 | 17.5 | 21.4 | 24.6 | 27.9 |
| 15. Northern Africa | 31.5 | 34.8 | 34.9 | 30.0 | 30.6 | 29.4 | 24.3 | 19.8 | 31.5 | 34.8 | 37.9 | 41.3 |
| 16. Southern Africa | 29.7 | 33.0 | 36.1 | 39.3 | 28.7 | 29.9 | 26.7 | 22.2 | 29.7 | 33.0 | 36.1 | 39.3 |
| F. 17. NORTHERN AMERICA | 17.2 | 18.1 | 17.6 | 16.4 | 11.8 | 11.7 | 10.5 | 7.3 | 16.0 | 18.2 | 19.4 | 19.5 |
| G. LATIN AMERICA | 33.4 | 35.2 | 36.1 | 31.5 | 32.7 | 28.5 | 23.0 | 19.5 | 33.6 | 36.3 | 38.9 | 40.6 |
| 18. Tropical South America | 36.8 | 37.7 | 39.1 | 34.5 | 36.2 | 31.1 | 24.5 | 20.0 | 36.8 | 38.0 | 41.3 | 42.8 |
| 19. Middle America (mainland) | 38.0 | 41.7 | 40.8 | 33.2 | 37.4 | 34.4 | 28.1 | 23.1 | 38.4 | 41.9 | 45.0 | 46.1 |
| 20. Temperate South America | 20.3 | 19.7 | 19.6 | 18.8 | 18.6 | 13.3 | 12.2 | 10.4 | 19.8 | 19.9 | 20.1 | 19.8 |
| 21. Caribbean | 25.5 | 27.8 | 27.7 | 23.2 | 25.0 | 22.0 | 17.3 | 14.3 | 27.8 | 30.9 | 33.5 | 35.7 |
| H. OCEANIA | 20.8 | 23.4 | 22.6 | 21.4 | 18.4 | 17.1 | 14.2 | 12.1 | 17.2 | 19.4 | 21.2 | 22.0 |
| 22. Australia and New Zealand | 19.9 | 20.9 | 20.2 | 18.6 | 17.3 | 16.2 | 13.2 | 10.7 | 15.6 | 17.3 | 18.0 | 18.1 |
| 23. Melanesia | 18.6 | 25.5 | 30.4 | 34.4 | 16.5 | 18.5 | 20.2 | 22.2 | 17.7 | 21.4 | 24.6 | 27.8 |
| 24. Polynesia and Micronesia | (42.0) | (45.0) | (35.0) | (25.0) | (35.0) | (25.0) | (15.0) | (5.0) | 40.0 ^b | 43.0 ^b | 45.0 ^b | 46.0 ^b |

^aArbitrarily assumed.^bConforms to a theoretical model.

TABLE A3.8
Population estimates, 1920-1960, and projections up to 1980, for countries in each region *

(Population in thousands)

| Region and Country | 1920 | 1930 | 1940 | 1950 | 1960 | 1965 | 1970 | 1975 | 1980 |
|---------------------------------------|---------|---------|---------|---------|---------|---------|---------|----------|----------|
| A. EAST ASIA | | | | | | | | | |
| 1. Mainland region TOTAL | 476,382 | 501,742 | 532,911 | 563,228 | 654,181 | 700,000 | 747,780 | 798,585 | 850,365 |
| Mainland China ^a | 475,000 | 500,000 | 530,000 | 560,000 | 650,000 | 695,000 | 742,000 | 792,000 | 843,000 |
| Hong Kong | 648 | 821 | 1,786 | 2,265 | 3,075 | 3,750 | 4,350 | 4,950 | 5,500 |
| Mongolia | 650 | 725 | 750 | 775 | 937 | 1,075 | 1,250 | 1,450 | 1,675 |
| Macao | 84 | 196 | 375 | 188 | 169 | 175 | 180 | 185 | 190 |
| 2. Japan | 55,391 | 63,872 | 71,400 | 82,900 | 93,210 | 97,523 | 101,465 | 106,174 | 111,064 |
| 3. Other East Asia TOTAL | 21,572 | 25,630 | 30,109 | 38,225 | 46,753 | 53,890 | 61,734 | 70,270 | 79,217 |
| Korea ^b | 17,264 | 20,438 | 23,547 | 29,907 | 35,265 | 40,755 | 46,940 | 53,718 | 60,837 |
| Republic of Korea | ... | ... | ... | 20,167 | 24,665 | 28,648 | 33,119 | 38,075 | 43,364 |
| North Korea | ... | ... | ... | 9,740 | 10,600 | 12,107 | 13,821 | 15,643 | 17,473 |
| China (Taiwan) | 3,736 | 4,614 | 5,987 | 7,619 | 10,612 | 12,175 | 13,754 | 15,427 | 17,180 |
| Ryukyu Islands | 572 | 578 | 575 | 699 | 876 | 960 | 1,040 | 1,125 | 1,200 |
| B. SOUTH ASIA | | | | | | | | | |
| 4. Middle South Asia TOTAL | 333,100 | 370,876 | 422,173 | 479,039 | 587,277 | 659,566 | 745,918 | 845,855 | 954,222 |
| India ^c | 250,500 | 278,000 | 317,000 | 359,250 | 432,750 | 483,500 | 543,200 | 611,000 | 682,300 |
| Pakistan ^d | 54,000 | 60,000 | 67,500 | 75,040 | 99,950 | 115,000 | 134,000 | 157,000 | 183,000 |
| Iran ^e | 11,000 | 12,400 | 14,000 | 16,276 | 20,182 | 22,570 | 25,440 | 28,900 | 33,050 |
| Afghanistan ^f | 7,000 | 8,350 | 10,000 | 12,000 | 14,400 | 15,900 | 17,600 | 19,600 | 22,100 |
| Ceylon | 4,486 | 5,253 | 5,972 | 7,678 | 9,896 | 11,490 | 13,370 | 15,630 | 18,300 |
| Nepal | 5,574 | 6,250 | 7,000 | 8,000 | 9,180 | 10,100 | 11,200 | 12,500 | 14,100 |
| Bhutan | 390 | 440 | 500 | 575 | 670 | 740 | 820 | 910 | 1,030 |
| Sikkim | 80 | 105 | 120 | 135 | 160 | 175 | 195 | 220 | 245 |
| Maldiv Islands | 70 | 78 | 81 | 85 | 89 | 91 | 93 | 95 | 97 |
| 5. South-East Asia TOTAL | 107,971 | 126,711 | 150,366 | 172,514 | 218,866 | 248,503 | 282,641 | 321,965 | 369,190 |
| Indonesia ^g | 52,300 | 60,750 | 70,500 | 76,700 | 94,250 | 105,500 | 118,250 | 133,500 | 152,750 |
| Viet-Nam ^h | 15,000 | 17,500 | 21,000 | 24,500 | 30,500 | 34,400 | 38,500 | 42,400 | 46,400 |
| Philippines | 10,600 | 13,094 | 16,459 | 20,316 | 27,407 | 32,315 | 38,432 | 46,063 | 55,750 |
| Thailand | 9,460 | 11,838 | 15,296 | 19,500 | 26,438 | 31,127 | 36,311 | 41,731 | 47,516 |
| Burma | 13,100 | 14,282 | 16,119 | 18,489 | 22,325 | 24,732 | 27,584 | 30,990 | 35,000 |
| Malaysia and Singapore | 3,861 | 5,032 | 6,027 | 7,122 | 9,742 | 11,374 | 13,251 | 15,470 | 18,121 |
| (Malaya) | (2,850) | (3,700) | (4,475) | (5,190) | (6,909) | (8,009) | (9,301) | (10,838) | (12,693) |
| (Singapore) | (391) | (596) | (751) | (1,022) | (1,634) | (1,971) | (2,333) | (2,758) | (3,223) |
| (Sarawak) | (400) | (440) | (495) | (562) | (745) | (866) | (1,008) | (1,170) | (1,379) |
| (Sabah) ⁱ | (220) | (296) | (306) | (348) | (454) | (528) | (609) | (704) | (826) |
| Cambodia | 2,400 | 2,800 | 3,400 | 4,074 | 5,600 | 6,390 | 7,330 | 8,450 | 9,810 |
| Laos | 800 | 930 | 1,075 | 1,325 | 1,805 | 2,000 | 2,240 | 2,520 | 2,870 |
| Portuguese Timor | 425 | 455 | 451 | 442 | 515 | 565 | 625 | 700 | 800 |
| Brunei | 25 | 30 | 39 | 46 | 84 | 100 | 118 | 141 | 173 |

* Unless otherwise indicated, the population estimates, 1920-1960, given in this table are those supplied by official sources, or interpolations and extrapolations thereof. The projections up to 1980 were prepared by the United Nations or derived from official and other projections according to the procedures explained in chapter 9 of the text.

^a See text for an evaluation of the figures.

^b The estimates for 1920, 1930, 1940 are census data unadjusted for mid-year. The 1950 estimates for the whole country and the Republic of Korea are actually estimates obtained from Republic of Korea, Economic Planning Board, *Korea Statistical Yearbook*, Seoul, 1963. The 1950 estimate for North Korea was obtained by subtraction.

^c Adjusted for each date to include former French and Portuguese possessions, Nagaland, North-East Frontier Agency, and the area of Kashmir-Jammu, the final status of which has not yet been determined.

^d Adjusted in view of probably incomplete census enumeration in 1931 and excessive enumeration in 1941. The 1960 total was adjusted for under-enumeration as estimated by the Planning Commission's report. No attempt was made to adjust the 1950 total.

^e Estimates for 1920 to 1940 are derived by applying assumed rates of growth.

^f Estimates are derived by applying assumed rates of growth.

^g Including West Irian (former West New Guinea) now administered by Indonesia.

^h All figures are for the whole country. The 1960 estimate was obtained by adding the official figures of 16,400 for North Viet-Nam and 14,100 for the Republic of Viet-Nam.

ⁱ Former North Borneo.

TABLE A3.8 (continued)

| Region and country | 1920 | 1930 | 1940 | 1950 | 1960 | 1965 | 1970 | 1975 | 1980 |
|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 6. South-West Asia ^j TOTAL | 28,699 | 31,377 | 37,454 | 45,169 | 59,104 | 67,405 | 77,305 | 89,259 | 103,044 |
| Northern Arab countries ^k | 5,650 | 7,000 | 8,750 | 11,617 | 15,832 | 18,664 | 22,010 | 26,168 | 31,285 |
| Iraq | | | | | 7,000 | 8,200 | 9,700 | 11,500 | 13,800 |
| Syria | | | | | 4,682 | 5,500 | 6,450 | 7,700 | 9,250 |
| Lebanon | | | | | 1,793 | 2,050 | 2,350 | 2,700 | 3,100 |
| Jordan | | | | | 1,695 | 2,000 | 2,350 | 2,800 | 3,350 |
| Gaza Strip (Palestine) | | | | | 375 | 440 | 500 | 620 | 750 |
| Kuwait | | | | | 287 | 474 | 660 | 848 | 1,035 |
| Southern Arab countries ^l | 7,250 | 8,200 | 9,350 | 10,850 | 12,767 | 14,007 | 15,464 | 17,316 | 19,488 |
| Saudi Arabia | | | | | 6,150 | 6,750 | 7,450 | 8,350 | 9,400 |
| Yemen | | | | | 4,500 | 4,925 | 5,450 | 6,100 | 6,900 |
| Protectorate of Southern Arabia | | | | | 1,000 | 1,100 | 1,200 | 1,350 | 1,500 |
| Muscat and Oman | | | | | 630 | 690 | 760 | 850 | 960 |
| Aden | | | | | 200 | 240 | 280 | 320 | 360 |
| Bahrain | | | | | 147 | 150 | 160 | 170 | 180 |
| Trucial Oman | | | | | 100 | 110 | 120 | 130 | 140 |
| Qatar | | | | | 40 | 42 | 44 | 46 | 48 |
| Turkey ^m | 13,000 | 15,100 | 17,821 | 20,947 | 27,818 | 31,781 | 36,602 | 42,267 | 48,478 |
| Israel ⁿ | 480 | 720 | 1,120 | 1,258 | 2,114 | 2,360 | 2,615 | 2,875 | 3,141 |
| Cyprus | 319 | 357 | 413 | 497 | 573 | 593 | 614 | 633 | 652 |
| C. EUROPE | | | | | | | | | |
| 7. Western Europe TOTAL | 101,351 | 108,583 | 113,246 | 122,437 | 134,536 | 140,345 | 144,045 | 147,785 | 151,820 |
| Germany Federal Republic | 35,000 | 37,500 | 40,600 | 47,847 | 53,224 | 55,600 | 56,600 | 57,300 | 58,500 |
| France ^o | 38,750 | 41,150 | 41,300 | 41,736 | 45,684 | 47,800 | 49,500 | 51,500 | 53,250 |
| Netherlands | 6,820 | 7,884 | 8,879 | 10,114 | 11,480 | 12,150 | 12,750 | 13,400 | 14,050 |
| Belgium | 7,552 | 8,076 | 8,301 | 8,639 | 9,153 | 9,360 | 9,580 | 9,850 | 10,100 |
| Austria | 6,455 | 6,684 | 6,705 | 6,935 | 7,081 | 7,160 | 7,220 | 7,220 | 7,275 |
| Switzerland | 3,881 | 4,059 | 4,234 | 4,694 | 5,362 | 5,760 | 5,920 | 6,080 | 6,250 |
| West Berlin | 2,600 | 2,900 | 2,900 | 2,139 | 2,199 | 2,150 | 2,100 | 2,050 | 2,000 |
| Luxembourg | 261 | 297 | 296 | 297 | 314 | 325 | 333 | 342 | 350 |
| Monaco | 23 | 23 | 20 | 22 | 23 | 24 | 25 | 26 | 27 |
| Liechtenstein | 9 | 10 | 11 | 14 | 16 | 16 | 17 | 17 | 18 |
| 8. Southern Europe TOTAL | 82,776 | 92,624 | 102,516 | 108,364 | 117,488 | 122,415 | 127,520 | 132,560 | 137,827 |
| Italy ^p | 37,006 | 40,293 | 43,840 | 46,603 | 49,642 | 51,200 | 52,900 | 54,600 | 56,400 |
| Spain | 21,196 | 23,445 | 25,757 | 27,868 | 30,303 | 31,700 | 33,100 | 34,500 | 36,000 |
| Yugoslavia ^q | 12,450 | 14,360 | 16,425 | 16,346 | 18,402 | 19,500 | 20,650 | 21,700 | 22,750 |
| Portugal | 6,000 | 6,804 | 7,696 | 8,405 | 8,826 | 9,120 | 9,320 | 9,520 | 9,750 |
| Greece | 5,078 | 6,447 | 7,410 | 7,566 | 8,327 | 8,620 | 8,920 | 9,200 | 9,500 |
| Albania ^r | 800 | 1,003 | 1,088 | 1,219 | 1,607 | 1,885 | 2,225 | 2,625 | 3,000 |
| Malta and Gozo | 210 | 240 | 270 | 312 | 329 | 337 | 350 | 360 | 370 |
| Gibraltar | 20 | 16 | 14 | 25 | 26 | 26 | 26 | 26 | 26 |
| San Marino | 10 | 10 | 10 | 13 | 17 | 17 | 18 | 18 | 19 |
| Andorra | 5 | 5 | 5 | 6 | 8 | 9 | 10 | 10 | 11 |
| Holy See | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

^j The figure for 1920 includes an allowance of two million as an estimate of deficiency in the 1923 estimate provided by the State Planning Organization of Turkey (see footnote *m* below). Prior to 1914, the population in the present area of Turkey probably surpassed 15 million, but may not have increased subsequently in view of Turkey's involvement in World War I and ensuing disturbances. A further decrease of population from 1920 to 1923 resulted from continuance of the civil war and from an extensive exchange of ethnic minorities between Turkey, Bulgaria and Greece.

^k The totals for 1920 to 1950 are the sums of estimates, based of fragmentary data, for individual countries. The figures for 1950 and 1960 include Palestinian refugees.

^l The totals for 1920 to 1950 are the sums of estimates, based on fragmentary data, for individual countries.

^m The estimate for 1920 is actually the 1923 estimate taken from Turkey, State Planning Organization, *First Five-year Plan (1963-1967)*, vol. I, p. 8. The 1930 estimate was adjusted to include Hatay, then under French administration.

ⁿ The figures for 1920 to 1940 are estimates of population within the present territory of Israel, derived in part from 1922 and 1931 censuses of Palestine and in part from official population estimates by ethnic group.

^o Estimate for 1939.

^p Estimates for 1920 to 1940 are adjusted for the present territory.

^q Estimates for 1920 to 1940 are adjusted for the present territory.

^r Estimates for 1920 to 1940 are adjusted to include estimates for Dodecanese Island, not under Greek administration at those dates.

TABLE A3.8 (continued)

| Region and country | 1920 | 1930 | 1940 | 1950 | 1960 | 1965 | 1970 | 1975 | 1980 |
|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 9. Eastern Europe TOTAL | 78,702 | 87,745 | 94,855 | 88,437 | 96,852 | 100,600 | 104,875 | 109,350 | 113,625 |
| Poland ^a | 26,000 | 29,500 | 31,500 | 24,977 | 29,703 | 31,500 | 33,600 | 35,900 | 38,000 |
| Romania | 12,407 | 14,212 | 15,901 | 16,100 | 18,403 | 19,325 | 20,300 | 21,250 | 22,250 |
| Eastern Germany ^b | 14,300 | 15,400 | 16,800 | 18,388 | 17,241 | 17,250 | 17,400 | 17,500 | 17,600 |
| Czechoslovakia | 12,979 | 13,964 | 14,713 | 12,389 | 13,654 | 14,125 | 14,675 | 15,275 | 15,800 |
| Hungary | 7,950 | 8,649 | 9,280 | 9,334 | 9,984 | 10,175 | 10,325 | 10,500 | 10,700 |
| Bulgaria ^c | 5,066 | 6,020 | 6,661 | 7,251 | 7,867 | 8,225 | 8,575 | 8,925 | 9,275 |
| 10. Northern Europe TOTAL | 61,971 | 64,995 | 68,303 | 72,477 | 75,781 | 78,008 | 79,880 | 81,787 | 83,620 |
| United Kingdom | 43,718 | 45,866 | 48,226 | 50,616 | 52,508 | 54,000 | 55,100 | 56,200 | 57,250 |
| Sweden | 5,876 | 6,131 | 6,356 | 7,014 | 7,480 | 7,700 | 7,920 | 8,150 | 8,375 |
| Denmark | 3,243 | 3,542 | 3,832 | 4,271 | 4,581 | 4,730 | 4,890 | 5,040 | 5,200 |
| Finland | 3,133 | 3,449 | 3,698 | 4,009 | 4,430 | 4,630 | 4,830 | 5,050 | 5,250 |
| Norway | 2,635 | 2,807 | 2,973 | 3,265 | 3,581 | 3,735 | 3,900 | 4,080 | 4,250 |
| Ireland | 3,103 | 2,927 | 2,958 | 2,969 | 2,834 | 2,830 | 2,840 | 2,850 | 2,860 |
| Iceland | 93 | 107 | 121 | 145 | 176 | 190 | 205 | 220 | 235 |
| Channel Islands | 90 | 92 | 65 | 104 | 109 | | | | |
| Isle of Man | 60 | 50 | 47 | 53 | 48 | 193 | 195 | 197 | 200 |
| Faeroe Islands | 20 | 24 | 27 | 31 | 34 | | | | |
| D. 11. USSR ^d | 155,300 | 179,000 | 195,000 | 180,000 | 214,400 | 231,000 | 245,700 | 260,800 | 277,800 |
| E. AFRICA | | | | | | | | | |
| 12. Western Africa TOTAL | 40,000 | 48,000 | 58,000 | 67,500 | 85,973 | 97,773 | 111,624 | 128,130 | 147,810 |
| Nigeria | | | | | 50,000 | 58,000 | 67,400 | 78,400 | 91,200 |
| Ghana | | | | | 6,777 | 7,808 | 9,054 | 10,500 | 12,250 |
| Upper Volta | | | | | 4,340 | 4,685 | 5,090 | 5,620 | 6,285 |
| Mali | | | | | 4,100 | 4,515 | 4,990 | 5,600 | 6,395 |
| Ivory Coast | | | | | 3,230 | 3,555 | 3,925 | 4,395 | 4,995 |
| Senegal | | | | | 3,110 | 3,330 | 3,610 | 3,970 | 4,435 |
| Guinea | | | | | 3,072 | 3,430 | 3,825 | 4,320 | 4,960 |
| Niger | | | | | 2,823 | 3,120 | 3,460 | 3,900 | 4,460 |
| Sierra Leone | | | | | 2,450 | 2,710 | 2,995 | 3,310 | 3,660 |
| Dahomey | | | | | 1,921 | 2,100 | 2,320 | 2,615 | 2,990 |
| Togo | | | | | 1,440 | 1,580 | 1,755 | 1,985 | 2,285 |
| Liberia | | | | | 980 | 1,040 | 1,100 | 1,160 | 1,230 |
| Mauritania | | | | | 694 | 715 | 740 | 790 | 860 |
| Other areas | | | | | 1,036 | 1,185 | 1,360 | 1,565 | 1,805 |
| 13. Eastern Africa ^e TOTAL | 40,000 | 46,000 | 54,000 | 62,500 | 75,032 | 82,768 | 91,760 | 102,745 | 115,410 |
| Ethiopia | | | | | 20,000 | 21,750 | 23,750 | 26,250 | 29,000 |
| United Republic of Tanzania | | | | | | | | | |
| Tanganyika | | | | | 9,239 | 10,150 | 11,260 | 12,600 | 14,140 |
| Zanzibar | | | | | 309 | 335 | 370 | 415 | 465 |
| Kenya | | | | | 8,115 | 9,150 | 10,350 | 11,800 | 13,600 |
| Uganda | | | | | 6,677 | 7,350 | 8,100 | 9,000 | 10,000 |
| Mozambique | | | | | 6,482 | 7,000 | 7,575 | 8,275 | 9,050 |
| Madagascar | | | | | 5,393 | 5,775 | 6,235 | 6,845 | 7,610 |
| Southern Rhodesia | | | | | 3,640 | 4,275 | 5,025 | 5,970 | 7,100 |
| Malawi | | | | | 3,500 | 4,000 | 4,600 | 5,300 | 6,100 |
| Zambia | | | | | 3,210 | 3,675 | 4,225 | 4,900 | 5,700 |
| Rwanda | | | | | 2,671 | 2,840 | 3,025 | 3,250 | 3,500 |
| Burundi | | | | | 2,500 | 2,850 | 3,250 | 3,700 | 4,200 |
| Somalia | | | | | 2,010 | 2,190 | 2,400 | 2,650 | 2,925 |
| Mauritius | | | | | 658 | 738 | 835 | 950 | 1,085 |
| Other areas ^f | | | | | 628 | 690 | 760 | 840 | 935 |

^a Estimate for 1939.^b Including East Berlin.^c Estimates for 1920 to 1940 include adjustment for territory previously part of Romania.^d Estimates 1920 and 1930 are based on those of Biraben and adjusted to agree with official estimates for other dates.^e Portuguese Guinea, Gambia, Cape Verde Islands and St. Helena; population assumed to increase at same rates as regional "medium" projection.^f Réunion, Comoro Islands, French Somaliland and Seychelles, population assumed to increase at same rates as regional "medium" projection.

TABLE A3.8 (continued)

| Region and country | 1920 | 1930 | 1940 | 1950 | 1960 | 1965 | 1970 | 1975 | 1980 |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 14. Middle Africa TOTAL | 20,000 | 21,000 | 23,000 | 25,000 | 28,345 | 30,315 | 32,715 | 35,985 | 40,275 |
| Democratic Republic of the Congo | | | | | 14,139 | 15,285 | 16,715 | 18,725 | 21,480 |
| Angola | | | | | 4,642 | 4,910 | 5,200 | 5,575 | 5,975 |
| Cameroon | | | | | 4,097 | 4,320 | 4,580 | 4,930 | 5,370 |
| Chad | | | | | 2,660 | 2,875 | 3,115 | 3,420 | 3,815 |
| Central African Republic | | | | | 1,210 | 1,280 | 1,355 | 1,455 | 1,590 |
| Congo (Brazzaville) | | | | | 850 | 855 | 915 | 995 | 1,095 |
| Gabon | | | | | 440 | 455 | 470 | 485 | 510 |
| Other areas ^g | | | | | 307 | 335 | 365 | 400 | 440 |
| 15. Northern Africa TOTAL | 35,075 | 39,119 | 44,773 | 52,594 | 65,955 | 75,357 | 86,740 | 100,400 | 116,460 |
| United Arab Republic | 13,277 | 14,822 | 16,942 | 20,448 | 25,952 | 29,800 | 34,500 | 40,150 | 46,750 |
| Sudan | 6,750 | 7,500 | 8,500 | 9,750 | 11,770 | 13,200 | 14,900 | 16,900 | 19,250 |
| Morocco | 6,330 | 6,980 | 7,750 | 8,876 | 11,626 | 13,600 | 16,000 | 18,900 | 22,400 |
| Algeria | 5,788 | 6,489 | 7,628 | 8,753 | 11,020 | 12,600 | 14,500 | 16,800 | 19,500 |
| Tunisia | 2,085 | 2,381 | 2,877 | 3,555 | 4,168 | 4,600 | 5,125 | 5,750 | 6,450 |
| Libya | 725 | 800 | 900 | 1,195 | 1,325 | 1,475 | 1,650 | 1,650 | 1,850 |
| Spanish North Africa | 85 | 112 | 136 | 141 | 152 | 156 | 160 | 165 | 170 |
| Spanish Sahara and Ifni ^h | 35 | 35 | 40 | 46 | 72 | 76 | 80 | 85 | 90 |
| 16. Southern Africa TOTAL | 7,846 | 9,727 | 11,685 | 13,944 | 17,619 | 19,940 | 22,860 | 25,875 | 29,575 |
| South Africa | 6,842 | 8,541 | 10,353 | 12,447 | 15,822 | 17,950 | 20,650 | 23,400 | 26,800 |
| Basutoland | 494 | 537 | 566 | 596 | 685 | 740 | 800 | 870 | 950 |
| South West Africa | 225 | 283 | 336 | 405 | 522 | 600 | 690 | 800 | 925 |
| Bechuanaland | 170 | 227 | 276 | 301 | 330 | 350 | 370 | 395 | 420 |
| Swaziland | 115 | 139 | 154 | 195 | 260 | 300 | 350 | 410 | 480 |
| F. 17. NORTHERN AMERICA TOTAL | 115,661 | 134,166 | 144,342 | 166,073 | 198,664 | 214,307 | 229,329 | 246,943 | 267,313 |
| United States ^{aa} | 106,782 | 123,616 | 132,594 | 152,271 | 180,676 | 194,406 | 207,552 | 223,003 | 240,893 |
| Canada | 8,839 | 10,498 | 11,693 | 13,737 | 17,909 | 19,814 | 21,680 | 23,832 | 26,300 |
| Bermuda | 22 | 32 | 32 | 37 | 43 | 46 | 50 | 54 | 58 |
| Greenland | 14 | 16 | 19 | 23 | 31 | 36 | 42 | 49 | 57 |
| St. Pierre and Miquelon | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 |
| G. LATIN AMERICA | | | | | | | | | |
| 18. Tropical South America ^{bb} TOTAL | 45,639 | 54,494 | 66,767 | 84,142 | 112,479 | 129,796 | 149,808 | 172,990 | 199,470 |
| Brazil ^{cc} | 27,554 | 33,718 | 41,525 | 52,328 | 70,459 | 81,450 | 93,902 | 108,013 | 123,716 |
| Colombia ^{dd} | 6,089 | 7,280 | 9,097 | 11,679 | 15,468 | 17,787 | 20,514 | 23,774 | 27,691 |
| Peru ^{ee} | 5,313 | 5,752 | 6,784 | 8,096 | 10,199 | 11,611 | 13,275 | 15,238 | 17,560 |
| Venezuela ^{ff} | 2,438 | 2,980 | 3,740 | 5,004 | 7,394 | 8,752 | 10,429 | 12,464 | 14,857 |
| Ecuador ^{gg} | 1,930 | 2,102 | 2,546 | 3,277 | 4,355 | 5,013 | 5,819 | 6,809 | 7,981 |
| Bolivia | 1,864 | 2,153 | 2,508 | 3,013 | 3,696 | 4,136 | 4,658 | 5,277 | 6,000 |
| British Guiana | 295 | 309 | 344 | 440 | 567 | 654 | 757 | 886 | 1,045 |
| Surinam | 130 | 170 | 193 | 235 | 308 | 355 | 411 | 481 | 567 |
| French Guiana | 26 | 30 | 30 | 30 | 33 | 38 | 43 | 48 | 53 |
| 19. Middle America (mainland) TOTAL | 19,443 | 22,456 | 26,863 | 34,694 | 46,811 | 55,323 | 65,565 | 77,975 | 93,141 |
| Mexico | 14,500 | 16,589 | 19,815 | 25,826 | 34,988 | 41,460 | 49,282 | 58,822 | 70,581 |
| Guatemala | 1,450 | 1,771 | 2,201 | 2,805 | 3,765 | 4,343 | 5,033 | 5,867 | 6,878 |
| El Salvador | 1,168 | 1,350 | 1,550 | 1,868 | 2,442 | 2,859 | 3,346 | 3,917 | 4,585 |
| Honduras | 783 | 948 | 1,146 | 1,428 | 1,838 | 2,182 | 2,592 | 3,078 | 3,656 |
| Nicaragua | 600 | 700 | 825 | 1,060 | 1,403 | 1,666 | 1,979 | 2,350 | 2,791 |
| Costa Rica | 421 | 499 | 619 | 801 | 1,171 | 1,424 | 1,718 | 2,049 | 2,419 |
| Panama ^{hh} | 447 | 523 | 620 | 797 | 1,079 | 1,249 | 1,458 | 1,713 | 2,023 |
| British Honduras ⁱⁱ | 44 | 51 | 56 | 67 | 90 | 105 | 122 | 144 | 173 |
| Canal Zone ^{jj} | 20 | 25 | 31 | 42 | 35 | 35 | 35 | 35 | 35 |

^gSpanish Equatorial Region, and São Tomé and Príncipe; population assumed to increase at same rates as regional "medium" projection.

^hThe 1960 estimates for Ifni and Spanish Sahara are 49,000 and 23,000 respectively.

^{aa}Including Alaska and Hawaii and, except in 1920, armed forces abroad.

^{bb}Except British Guiana, Surinam and French Guiana, estimates taken from *Statistical Bulletin for Latin America*, vol. 1, No. 1, March 1964, Economic Commission for Latin America, Santiago, Chile.

^{cc}Including jungle inhabitants estimated at the constant figure of 150,000. The estimates for 1950 and 1960 are taken from C. Arretx, *Proyección de la población del Brasil*, Santiago, Chile, 1963.

^{dd}Estimates for 1950 and 1960 are adjusted to include allowance for omissions at 1951 census.

^{ee}Including jungle inhabitants estimated at the constant figure of 101,000.

^{ff}Including jungle inhabitants estimated at the constant figure of 30,000.

^{gg}Including jungle inhabitants estimated at the constant figure of 80,000.

^{hh}Including tribal Indians, but not including Canal Zone. The figure for 1930 includes an estimate of 52,000 tribal Indians at 1930 census.

ⁱⁱThe figure for 1920 is actually for 31 December.

^{jj}Civilian population only.

TABLE A3.8 (continued)

| Region and country | 1920 | 1930 | 1940 | 1950 | 1960 | 1965 | 1970 | 1975 | 1980 |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 20. Temperate South America TOTAL | 14,826 | 18,877 | 22,319 | 26,856 | 32,796 | 36,067 | 39,574 | 43,359 | 47,485 |
| Argentina | 8,861 | 11,896 | 14,169 | 17,189 | 20,956 | 22,841 | 24,784 | 26,828 | 28,998 |
| Chile | 3,785 | 4,365 | 5,063 | 6,073 | 7,627 | 8,625 | 9,753 | 10,996 | 12,378 |
| Uruguay | 1,479 | 1,734 | 1,974 | 2,195 | 2,491 | 2,647 | 2,802 | 2,960 | 3,126 |
| Paraguay | 699 | 880 | 1,111 | 1,397 | 1,720 | 1,952 | 2,233 | 2,573 | 2,981 |
| Falkland Islands | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 21. Caribbean TOTAL | 9,666 | 11,591 | 13,891 | 16,693 | 20,345 | 22,757 | 25,500 | 28,598 | 32,119 |
| Cuba | 2,950 | 3,837 | 4,566 | 5,508 | 6,797 | 7,523 | 8,307 | 9,146 | 10,034 |
| Haiti | 2,124 | 2,422 | 2,827 | 3,380 | 4,140 | 4,645 | 5,255 | 6,001 | 6,912 |
| Dominican Republic ^{kk} | 1,140 | 1,400 | 1,759 | 2,243 | 3,030 | 3,588 | 4,277 | 5,124 | 6,174 |
| Puerto Rico | 1,312 | 1,552 | 1,880 | 2,218 | 2,361 | 2,557 | 2,754 | 2,935 | 3,117 |
| Jamaica | 855 | 1,009 | 1,212 | 1,403 | 1,607 | 1,720 | 1,840 | 1,960 | 2,080 |
| Trinidad and Tobago | 389 | 405 | 510 | 632 | 844 | 975 | 1,120 | 1,280 | 1,450 |
| Windward Islands ^{ll} | 200 | 220 | 259 | 277 | 315 | 350 | 395 | 445 | 480 |
| Martinique ^{mm} | 165 | 175 | 200 | 222 | 277 | 315 | 358 | 406 | 463 |
| Guadeloupe ⁿⁿ | 150 | 160 | 185 | 206 | 270 | 306 | 347 | 392 | 445 |
| Barbados | 155 | 159 | 179 | 209 | 232 | 255 | 270 | 280 | 285 |
| Netherlands Antilles ^{oo} | 55 | 72 | 107 | 162 | 190 | 210 | 230 | 245 | 260 |
| Leeward Islands ^{pp} | 85 | 86 | 99 | 113 | 130 | 143 | 157 | 170 | 180 |
| Bahama Islands | 55 | 61 | 70 | 79 | 105 | 120 | 135 | 155 | 175 |
| Virgin Islands ^{qq} | 20 | 22 | 25 | 27 | 33 | 36 | 40 | 44 | 48 |
| Cayman Islands | 5 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 |
| Turks and Caicos Islands | 6 | 5 | 6 | 7 | 6 | 6 | 6 | 6 | 6 |
| H. OCEANIA | | | | | | | | | |
| 22. Australia and New Zealand TOTAL | 6,641 | 7,994 | 8,715 | 10,127 | 12,687 | 14,015 | 15,244 | 16,572 | 18,237 |
| Australia ^{rr} | 5,400 | 6,503 | 7,079 | 8,219 | 10,315 | 11,356 | 12,300 | 13,308 | 14,571 |
| New Zealand | 1,241 | 1,491 | 1,636 | 1,908 | 2,372 | 2,659 | 2,944 | 3,264 | 3,666 |
| 23. Melanesia TOTAL | 1,500 | 1,600 | 1,750 | 1,900 | 2,166 | 2,338 | 2,549 | 2,804 | 3,107 |
| New Guinea | | | | | 1,402 | 1,509 | 1,639 | 1,799 | 1,985 |
| Papua | | | | | 503 | 549 | 605 | 672 | 753 |
| British Solomon Islands | | | | | 124 | 132 | 142 | 151 | 167 |
| New Caledonia | | | | | 77 | 83 | 91 | 101 | 112 |
| New Hebrides | | | | | 59 | 64 | 71 | 80 | 89 |
| Norfolk Island | | | | | 1 | 1 | 1 | 1 | 1 |
| 24. Polynesia and Micronesia. TOTAL | 380 | 450 | 595 | 650 | 860 | 1,011 | 1,212 | 1,456 | 1,745 |
| Polynesia | 268 | 314 | 392 | 511 | 678 | 797 | 956 | 1,147 | 1,376 |
| Fiji Islands | 161 | 181 | 218 | 289 | 394 | 463 | 556 | 667 | 800 |
| Western Samoa | 35 | 45 | 61 | 79 | 107 | 126 | 151 | 181 | 217 |
| French Polynesia | 32 | 39 | 50 | 61 | 76 | 89 | 107 | 128 | 154 |
| Tonga | 23 | 28 | 37 | 48 | 63 | 74 | 89 | 107 | 128 |
| American Samoa | 8 | 10 | 13 | 19 | 20 | 24 | 28 | 34 | 41 |
| Cook Islands | 9 | 11 | 13 | 15 | 18 | 21 | 25 | 30 | 36 |
| Micronesia | 112 | 136 | 203 | 139 | 182 | 214 | 256 | 309 | 369 |
| Pacific Islands ^{ss} | 56 | 70 | 134 | 57 | 76 | 89 | 107 | 129 | 154 |
| Gilbert and Ellice Islands | 30 | 34 | 34 | 38 | 46 | 54 | 65 | 78 | 93 |
| Guam ^{tt} | 14 | 19 | 22 | 30 | 40 | 47 | 56 | 68 | 81 |
| Other islands ^{uu} | 12 | 13 | 13 | 14 | 20 | 24 | 28 | 34 | 41 |

^{kk} Figures for 1920 and 1930 adjusted for probable under-enumeration at 1920 census.

^{ll} Dominica, Grenada, St. Lucia and St. Vincent.

^{mm} Estimates for 1920 to 1940 were prepared by assuming the population to have been growing similar to Windward Islands.

ⁿⁿ Estimates for 1920 to 1940 were prepared by assuming the population to have been growing similar to Windward Islands.

^{oo} Curaçao, Aruba, Bonaire, Saba, St. Eustatius, and part of St. Martin.

^{pp} Antigua, Montserrat, St. Kitts-Nevis and Anguilla, and Virgin Islands, under United Kingdom administration.

^{qq} St. Thomas, St. Croix, and St. John, under United States administration.

^{rr} Including full-blooded aborigines estimated at a constant figure of 40,000.

^{ss} Under United States administration.

^{tt} For indigenous population only. The indigenous populations in 1950 and 1960 have been estimated from fragmentary data, as official population estimates include a relatively large number of United States military personnel and their dependants.

^{uu} Islands with population smaller than 5,000 in 1960, namely: Nive, Nauru, Christmas Islands, Midway Islands, Tokelau Islands, Wake Islands, Cocos (Keeling) Islands, Canton and Enderbury Islands, Bonin Islands, Johnston Islands.

TABLE A3.9
**Decennial rates of increase of population estimated for 1920-1960 and projected up to 1980,
 for countries in each region**
(Per cent increase of population during ten-year periods)

| Regions and countries | 1920-1930 | 1930-1940 | 1940-1950 | 1950-1960 | 1960-1970 | 1970-1980 |
|------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| A. EAST ASIA | | | | | | |
| 1. Mainland region | 5.3 | 6.2 | 5.7 | 16.1 | 14.3 | 13.7 |
| Mainland China | 5.3 | 6.0 | 5.7 | 16.1 | 14.2 | 13.6 |
| Hong Kong | | | | 35.8 | 41.5 | 26.4 |
| Mongolia | 11.5 | 3.4 | 3.3 | 20.9 | 33.4 | 34.0 |
| Macao | | | | 10.6 | 6.5 | 5.6 |
| 2. Japan | 15.3 | 11.8 | 16.1 | 12.4 | 8.9 | 9.5 |
| 3. Other East Asia | | | | | | |
| Korea | 18.4 | 15.2 | 27.0 | 17.9 | 33.1 | 29.6 |
| Republic of Korea | | | | | 34.3 | 30.9 |
| North Korea | | | | | 30.4 | 26.4 |
| China (Taiwan) | 23.6 | 29.8 | 27.3 | 39.3 | 29.6 | 24.9 |
| Ryukyu Islands | 1.0 | -0.5 | 21.6 | 25.3 | 18.7 | 15.4 |
| B. SOUTH ASIA | | | | | | |
| 4. Middle South Asia | | | | | | |
| India | 11.0 | 14.0 | 13.3 | 20.5 | 25.5 | 25.6 |
| Pakistan ^a | 11.1 | 12.5 | 11.2 | 33.2 | 34.1 | 36.6 |
| Iran ^b | (12.7) | (12.9) | (16.3) | 24.0 | 26.1 | 29.9 |
| Afghanistan ^c | (19.3) | (19.8) | (20.0) | (20.0) | 22.2 | 25.6 |
| Ceylon | 17.1 | 13.7 | 28.6 | 28.9 | 35.1 | 36.9 |
| Nepal | 12.1 | 12.0 | 14.3 | 14.8 | 22.0 | 25.9 |
| Bhutan | 12.8 | 13.6 | 15.0 | 16.5 | 22.4 | 25.6 |
| Sikkim | 31.3 | 14.3 | 12.5 | 18.5 | 21.9 | 25.6 |
| Maldiv Islands | 11.4 | 3.8 | 4.9 | 4.7 | 4.5 | 4.3 |
| 5. South-East Asia | | | | | | |
| Indonesia | 16.2 | 16.0 | 8.8 | 22.9 | 25.5 | 29.2 |
| Viet-Nam ^d | 16.7 | 20.0 | 16.7 | 24.5 | 26.2 | 20.5 |
| Philippines | 23.5 | 25.7 | 23.4 | 34.9 | 40.2 | 45.1 |
| Thailand | 25.1 | 29.2 | 27.5 | 35.6 | 37.3 | 30.9 |
| Burma | 9.0 | 12.9 | 14.7 | 20.7 | 23.6 | 26.9 |
| Malaysia and Singapore | 30.3 | 19.8 | 18.2 | 36.8 | 36.0 | 36.8 |
| (Malaya) | (29.8) | (20.9) | (16.0) | (33.1) | (34.6) | (36.5) |
| (Singapore) | (52.4) | (26.0) | (36.1) | (59.9) | (42.8) | (38.1) |
| (Sarawak) | (10.0) | (12.5) | (13.5) | (32.6) | (35.3) | (36.8) |
| (Sabah) | (34.5) | (3.4) | (13.7) | (30.5) | (34.1) | (35.6) |
| Cambodia | 16.7 | 21.4 | 19.8 | 37.5 | 30.9 | 33.8 |
| Laos | 16.3 | 15.6 | 23.3 | 36.2 | 24.1 | 28.1 |
| Portuguese Timor | 7.1 | -0.9 | -2.0 | 16.5 | 21.4 | 28.0 |
| Brunei | 20.0 | 30.0 | 17.9 | 82.6 | 40.5 | 46.6 |
| 6. South-West Asia | | | | | | |
| Northern Arab countries | (23.9) | (25.0) | (32.8) | 36.3 | 39.0 | 42.1 |
| Iraq | | | | | 38.6 | 42.3 |
| Syria | | | | | 37.8 | 43.4 |
| Lebanon | | | | | 31.1 | 31.9 |
| Jordan | | | | | 38.6 | 42.6 |
| Gaza Strip (Palestine) | | | | | 33.3 | 50.0 |
| Kuwait | | | | | | 56.8 |
| Southern Arab countries | (13.1) | (14.0) | (16.0) | 17.7 | 21.1 | 26.0 |
| Saudi Arabia | | | | | 21.1 | 26.2 |
| Yemen | | | | | 21.1 | 26.6 |
| Protectorate of Southern | | | | | | |
| Arabia | | | | | 20.0 | 25.0 |
| Muscat and Oman | | | | | 20.6 | 26.3 |
| Aden | | | | | 40.0 | 28.6 |
| Bahrain | | | | | 8.8 | 12.5 |

^a Adjusted in view of probably incomplete census enumeration in 1931 and excessive enumeration in 1941. The 1960 total was adjusted for under-enumeration as estimated in the Planning Commission's report. No attempt was made to adjust the 1950 total. This probably accounts for the implausible rates of growth for 1940-1950 and 1950-1960.

^b Rates for 1920 to 1960 are based on assumed rates.

^c Rates for 1920 to 1960 are based on assumed rates.

^d Composed of the Republic of Viet-Nam and North Viet-Nam.

TABLE A3.9 (continued)

| Regions and countries | 1920-1930 | 1930-1940 | 1940-1950 | 1950-1960 | 1960-1970 | 1970-1980 |
|--|-----------|------------------|--------------------|-----------|-----------|-----------|
| Trucial Oman | | | | | 20.0 | 16.7 |
| Qatar | | | | | 10.0 | 9.1 |
| Turkey | 16.2 | 18.0 | 17.5 | 32.8 | 31.6 | 32.4 |
| Israel | (50.0) | (55.6) | (12.3) | 68.0 | 23.7 | 20.1 |
| Cyprus | 11.9 | 15.7 | 20.3 | 15.3 | 7.2 | 6.2 |
| C. EUROPE | | | | | | |
| 7. Western Europe | | | | | | |
| Federal Republic of Germany | 7.1 | 8.3 | 17.8 | 11.2 | 6.3 | 3.4 |
| France | 6.2 | 0.4 ^e | 1.1 ^f | 9.5 | 8.4 | 7.6 |
| Netherlands | 15.6 | 12.6 | 13.9 | 13.5 | 11.1 | 10.2 |
| Belgium | 6.9 | 2.8 | 4.1 | 5.9 | 4.7 | 5.4 |
| Austria | 3.5 | 0.3 | 3.4 | 2.1 | 2.0 | 0.8 |
| Switzerland | 4.6 | 4.3 | 10.9 | 14.2 | 10.4 | 5.6 |
| West Berlin | 11.5 | 0.0 | -26.2 | 2.8 | -4.5 | -4.8 |
| Luxembourg | 13.8 | -0.3 | 0.3 | 5.7 | 6.1 | 5.1 |
| Monaco | 0.0 | 13.0 | 10.0 | 4.5 | 8.7 | 8.0 |
| Liechtenstein | 11.1 | 10.0 | 27.3 | 14.3 | 6.3 | 5.9 |
| 8. Southern Europe | | | | | | |
| Italy | 8.9 | 8.8 | 6.3 | 6.5 | 6.6 | 6.6 |
| Spain | 10.6 | 9.9 | 8.2 | 8.7 | 9.2 | 8.8 |
| Yugoslavia | 15.3 | 14.4 | -0.5 | 12.6 | 12.2 | 10.2 |
| Portugal | 13.4 | 13.1 | 9.2 | 5.0 | 5.6 | 4.6 |
| Greece | 27.0 | 14.9 | 2.1 | 10.1 | 7.1 | 6.5 |
| Albania | 25.4 | 8.5 | 12.0 | 31.8 | 38.5 | 34.8 |
| Malta and Gozo | 14.3 | 12.5 | 15.6 | 5.4 | 6.4 | 5.7 |
| Gibraltar | -20.0 | -12.5 | 78.6 | 4.0 | 0.0 | 0.0 |
| San Marino | 0.0 | 0.0 | 30.0 | 30.8 | 5.9 | 5.6 |
| Andorra | 0.0 | 0.0 | 20.0 | 33.3 | 25.0 | 10.0 |
| Holy See | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 9. Eastern Europe | | | | | | |
| Poland | 13.5 | 6.8 ^g | -20.7 ^h | 18.9 | 13.1 | 13.1 |
| Romania | 14.5 | 11.9 | 1.3 | 14.3 | 10.3 | 9.6 |
| Eastern Germany ⁱ | 7.7 | 9.1 | 9.5 | -6.2 | 0.9 | 1.1 |
| Czechoslovakia | 7.6 | 5.4 | -15.8 | 10.2 | 7.5 | 7.7 |
| Hungary | 8.8 | 7.3 | 0.6 | 7.0 | 3.4 | 3.6 |
| Bulgaria | 18.8 | 10.6 | 8.9 | 8.5 | 9.0 | 8.2 |
| 10. Northern Europe | | | | | | |
| United Kingdom | 4.9 | 5.1 | 5.0 | 3.7 | 4.9 | 3.9 |
| Sweden | 4.3 | 3.7 | 10.4 | 6.6 | 5.9 | 5.7 |
| Denmark | 9.2 | 8.2 | 11.5 | 7.3 | 6.7 | 6.3 |
| Finland | 10.1 | 7.2 | 8.4 | 10.5 | 9.0 | 8.7 |
| Norway | 6.5 | 5.9 | 9.8 | 9.7 | 8.9 | 9.0 |
| Ireland | -5.7 | 1.1 | 0.4 | -4.5 | 0.2 | 0.7 |
| Iceland | 15.1 | 13.1 | 19.8 | 21.4 | 16.5 | 14.6 |
| Channel Islands | 2.2 | -29.3 | 60.0 | 4.8 | | |
| Isle of Man | -16.7 | -6.0 | 12.8 | -9.4 | 2.1 | 2.6 |
| Faeroe Islands | 20.0 | 12.5 | 14.8 | 9.7 | | |
| D. 11. USSR | 15.3 | 8.9 | -7.7 | 19.1 | 14.6 | 13.1 |
| E. AFRICA | | | | | | |
| 12. Western Africa | | | | | | |
| Nigeria | | | | | 34.8 | 35.3 |
| Ghana | | | | | 33.6 | 35.3 |
| Upper Volta | | | | | 17.3 | 23.5 |
| Mali | | | | | 21.7 | 28.2 |
| Ivory Coast | | | | | 21.5 | 27.3 |
| Senegal | | | | | 16.1 | 22.9 |
| Guinea | | | | | 24.5 | 29.7 |
| Niger | | | | | 22.6 | 28.9 |

^e For 1930-1939.^f For 1939-1950.^g For 1930-1939, based on inadequate data.^h For 1939-1950.ⁱ Including East Berlin.

TABLE A3.9 (continued)

| Regions and countries | 1920-1930 | 1930-1940 | 1940-1950 | 1950-1960 | 1960-1970 | 1970-1980 |
|--|-----------|-----------|-----------|-----------|------------------|-----------|
| Sierra Leone | | | | | 22.2 | 22.2 |
| Dahomey | | | | | 20.8 | 28.9 |
| Togo | | | | | 21.9 | 30.2 |
| Liberia | | | | | 12.2 | 11.8 |
| Mauritania | | | | | 6.6 | 16.2 |
| Other areas ^j | | | | | 31.3 | 32.7 |
| 13. Eastern Africa | | | | | | |
| Ethiopia | | | | | 18.8 | 22.1 |
| United Republic of Tanzania | | | | | | |
| Tanganyika | | | | | 21.9 | 25.6 |
| Zanzibar | | | | | 19.7 | 25.7 |
| Kenya | | | | | 27.5 | 31.4 |
| Uganda | | | | | 21.3 | 23.5 |
| Mozambique | | | | | 16.9 | 19.5 |
| Madagascar | | | | | 15.6 | 22.1 |
| Southern Rhodesia | | | | | 38.0 | 41.3 |
| Malawi | | | | | 31.4 | 32.6 |
| Zambia | | | | | 31.6 | 34.9 |
| Rwanda | | | | | 13.3 | 15.7 |
| Burundi | | | | | 30.0 | 29.2 |
| Somalia | | | | | 19. ^a | 21.9 |
| Mauritius | | | | | 26.9 | 29.9 |
| Other areas ^k | | | | | 21.0 | 23.0 |
| 14. Middle Africa | | | | | | |
| Democratic Republic of the Congo | | | | | 18.2 | 28.5 |
| Angola | | | | | 12.0 | 14.9 |
| Cameroon | | | | | 11.8 | 17.2 |
| Chad | | | | | 17.1 | 22.5 |
| Central African Republic | | | | | 12.0 | 17.3 |
| Congo (Brazzaville) | | | | | 7.6 | 19.7 |
| Gabon | | | | | 6.8 | 8.5 |
| Other areas ^l | | | | | 18.9 | 20.5 |
| 15. Northern Africa | | | | | | |
| United Arab Republic | 11.6 | 14.3 | 20.7 | 26.9 | 32.9 | 35.5 |
| Sudan ^m | 11.1 | 13.3 | 14.7 | 20.7 | 26.6 | 29.2 |
| Morocco ⁿ | 10.3 | 11.0 | 14.5 | 31.0 | 37.6 | 40.0 |
| Algeria | 12.1 | 17.6 | 14.7 | 25.9 | 31.6 | 34.5 |
| Tunisia | 14.2 | 20.8 | 23.6 | 17.2 | 23.0 | 25.9 |
| Libya | 10.3 | 12.5 | 13.9 | 16.6 | 23.4 | 25.4 |
| Spanish North Africa | 31.8 | 21.4 | 3.7 | 7.8 | 5.3 | 6.3 |
| Spanish Sahara and Ifni | 0.0 | 14.2 | 15.0 | 56.5 | 11.1 | 12.5 |
| 16. Southern Africa | | | | | | |
| South Africa | 24.8 | 21.2 | 20.2 | 27.1 | 30.5 | 29.8 |
| Basutoland | 8.7 | 5.4 | 5.3 | 14.9 | 16.8 | 18.8 |
| South West Africa | 25.8 | 18.7 | 20.5 | 28.9 | 32.2 | 34.1 |
| Bechuanaland | 33.5 | 21.6 | 9.1 | 9.6 | 12.1 | 13.5 |
| Swaziland | 20.9 | 10.8 | 26.6 | 33.3 | 34.6 | 37.1 |
| F. 17. NORTHERN AMERICA | | | | | | |
| United States | 15.8 | 7.3 | 14.8 | 18.7 | 14.9 | 16.1 |
| Canada | 18.8 | 11.4 | 17.5 | 30.4 | 21.1 | 21.3 |
| Bermuda | 45.5 | 0.0 | 15.6 | 16.2 | 16.3 | 16.0 |
| Greenland | 14.3 | 18.8 | 21.1 | 34.8 | 35.5 | 35.7 |
| St. Pierre and Miquelon | 0.0 | 0.0 | 25.0 | 0.0 | 0.0 | 0.0 |

^jPortuguese Guinea, Gambia, Cape Verde Islands and St. Helena; assumed to increase at same rates as "medium" projections for region.

^kRéunion, Comoro Islands, French Somaliland and Seychelles; assumed to increase at same rate as regional "medium" projection.

^lEquatorial Guinea and Sao Tomé and Príncipe; assumed to increase at same rate as regional medium projection.

^mRates for 1920 to 1950 are assumed.

ⁿRates for 1920 to 1940 are assumed.

TABLE A3.9 (continued)

| Regions and countries | 1920-1930 | 1930-1940 | 1940-1950 | 1950-1960 | 1960-1970 | 1970-1980 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|
| G. LATIN AMERICA | | | | | | |
| 18. Tropical South America | | | | | | |
| Brazil | 22.4 | 23.2 | 26.0 | 34.6 | 33.3 | 31.8 |
| Colombia | 19.6 | 25.0 | 28.4 | 32.4 | 32.6 | 35.0 |
| Peru | 8.3 | 17.9 | 19.3 | 26.0 | 30.2 | 32.3 |
| Venezuela | 22.2 | 25.5 | 33.8 | 47.8 | 41.0 | 42.5 |
| Ecuador | 8.9 | 21.1 | 28.7 | 32.9 | 33.6 | 37.2 |
| Bolivia | 15.5 | 16.5 | 20.1 | 22.7 | 26.0 | 28.8 |
| British Guiana | 4.7 | 11.3 | 27.9 | 28.9 | 33.5 | 38.0 |
| Surinam | 30.8 | 13.5 | 21.8 | 31.1 | 33.4 | 38.0 |
| French Guiana | 15.4 | 0.0 | 0.0 | 10.0 | 30.3 | 23.3 |
| 19. Middle America (mainland) | | | | | | |
| Mexico | 14.4 | 19.4 | 30.3 | 35.5 | 40.9 | 43.2 |
| Guatemala | 22.1 | 24.3 | 27.4 | 34.2 | 33.7 | 36.7 |
| El Salvador | 15.6 | 14.8 | 20.5 | 30.7 | 37.0 | 37.0 |
| Honduras | 21.1 | 20.9 | 24.6 | 28.7 | 41.0 | 41.0 |
| Nicaragua | 16.7 | 17.9 | 28.5 | 32.4 | 41.0 | 41.0 |
| Costa Rica | 18.5 | 24.0 | 29.4 | 46.2 | 46.7 | 40.8 |
| Panama ^a | 17.0 | 18.5 | 28.5 | 35.4 | 35.1 | 38.8 |
| British Honduras | 15.9 | 9.8 | 19.6 | 34.3 | 35.6 | 41.8 |
| Canal Zone | 25.0 | 24.0 | 35.5 | -16.7 | 0.0 | 0.0 |
| 20. Temperate South America | | | | | | |
| Argentina | 34.3 | 19.1 | 21.3 | 21.9 | 18.3 | 17.0 |
| Chile | 15.3 | 16.0 | 19.9 | 25.6 | 27.9 | 26.9 |
| Uruguay | 17.2 | 13.8 | 11.2 | 13.5 | 12.5 | 11.6 |
| Paraguay | 25.9 | 26.3 | 25.7 | 23.1 | 29.8 | 33.5 |
| Falkland Islands | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 21. Caribbean | | | | | | |
| Cuba | 30.1 | 19.0 | 20.6 | 23.4 | 22.2 | 20.8 |
| Haiti | 14.0 | 16.7 | 19.6 | 22.5 | 26.9 | 31.5 |
| Dominican Republic | 22.8 | 25.6 | 27.5 | 35.1 | 41.2 | 44.4 |
| Puerto Rico | 18.3 | 21.1 | 18.0 | 6.4 | 16.6 | 13.2 |
| Jamaica | 18.0 | 20.1 | 15.8 | 14.5 | 14.5 | 13.0 |
| Trinidad and Tobago | 4.1 | 25.9 | 23.9 | 33.5 | 32.7 | 29.5 |
| Windward Islands ^b | 10.0 | 17.7 | 6.9 | 13.7 | 25.4 | 21.5 |
| Martinique | 6.1 | 14.3 | 11.0 | 24.8 | 29.2 | 29.3 |
| Guadeloupe | 6.7 | 15.6 | 11.4 | 31.1 | 28.5 | 28.2 |
| Barbados | 2.6 | 12.6 | 16.8 | 11.0 | 16.4 | 5.6 |
| Netherlands Antilles ^c | 30.9 | 48.6 | 51.4 | 17.3 | 21.1 | 13.0 |
| Leeward Islands ^d | 1.2 | 15.1 | 14.1 | 15.0 | 20.8 | 14.6 |
| Bahama Islands | 10.9 | 14.8 | 12.9 | 32.9 | 28.5 | 29.6 |
| Virgin Islands ^e | 10.0 | 13.6 | 8.0 | 22.2 | 21.2 | 20.0 |
| Cayman Islands | 20.0 | 16.7 | 0.0 | 14.3 | 12.5 | 11.1 |
| Turks and Caicos Islands | -16.7 | 20.0 | 16.7 | -14.3 | 0.0 | 0.0 |
| H. OCEANIA | | | | | | |
| 22. Australia and New Zealand | | | | | | |
| Australia ^f | 20.4 | 8.9 | 16.1 | 25.5 | 19.2 | 18.5 |
| New Zealand | 20.1 | 9.7 | 16.6 | 24.3 | 24.1 | 24.5 |
| 23. Melanesia | | | | | | |
| New Guinea | | | | | 16.9 | 21.1 |
| Papua | | | | | 20.3 | 24.5 |
| British Solomon Islands | | | | | 14.5 | 17.6 |
| New Caledonia | | | | | 18.2 | 23.1 |
| New Hebrides | | | | | 20.3 | 25.4 |
| Norfolk Island | | | | | 0.0 | 0.0 |

^aIncluding tribal Indians.^bDominica, Grenada, St. Lucia and St. Vincent.^cCuraçao, Aruba, Bonaire, Saba, St. Eustatius, and part of St. Martin.^dAntigua, Montserrat, St. Kitts-Nevis and Anguilla, and Virgin Islands, under United Kingdom administration.^eSt. Thomas, St. Croix, and St. John, under United States administration.^fIncluding full-blooded aborigines estimated at a constant figure of 40,000.

TABLE A3.9 (continued)

| Regions and countries | 1920-1930 | 1930-1940 | 1940-1950 | 1950-1960 | 1960-1970 | 1970-1980 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|
| 24. Polynesia and Micronesia | | | | | | |
| Polynesia | | | | | | |
| Fiji Islands | 12.4 | 20.4 | 32.6 | 36.3 | 41.1 | 43.9 |
| Western Samoa | 28.6 | 35.6 | 29.5 | 35.4 | 41.1 | 43.7 |
| French Polynesia | 21.9 | 28.2 | 22.0 | 24.6 | 40.8 | 43.9 |
| Tonga | 21.7 | 32.1 | 29.7 | 31.3 | 41.3 | 43.8 |
| American Samoa | 25.0 | 30.0 | 46.2 | 5.3 | 40.0 | 46.4 |
| Cook Islands | 22.2 | 18.2 | 15.4 | 20.0 | 38.9 | 44.0 |
| Micronesia | | | | | | |
| Pacific Islands ^a | 25.0 | 91.4 | -57.5 | 33.3 | 40.8 | 43.9 |
| Gilbert and Ellice Islands | 13.3 | 0.0 | 11.8 | 21.1 | 41.3 | 43.1 |
| Guam | 35.7 | 15.8 | 36.4 | 33.3 | 40.0 | 44.6 |
| Other islands ^b | 8.3 | 0.0 | 7.7 | 42.9 | 40.0 | 46.4 |

^a Under United States administration.

^b Islands with population smaller than 5,000 in 1960, namely: Niue, Nauru, Christmas Islands, Midway Islands, Tokelau Islands, Wake Island, Cocos

(Keeling) Islands, Canton and Enderbury Islands, Bonin Islands, Johnston Island, and Pitcairn Island.